Government of Ontario

Ministry of Community and Social Services

Business Transformation Project Review

**Volume 3,
Appendices**

HLB Project No. 6573
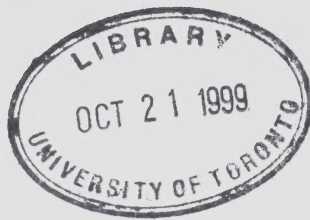
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GOVERNMENT OF ONTARIO

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GOVERNMENT OF ONTARIO

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Volume 5.

Appendices

REVIEW OF CURRENT CANADIAN GOVERNMENT

DIRECTION IN PROCUREMENT

BACKGROUND

As the Canadian government faces increased pressure to streamline its activities in an effort to control its budget, departments are looking to information technology (IT)-based solutions. IT-based solutions are looked to by federal government departments as a means by which programs and services may be delivered more efficiently and effectively.

While in some cases, investment in such solutions have produced great dividends, in others, expectations have not been met. Problems arise either because projects can not be completed within budget or because they do not, when completed, deliver the desired results.

Though not the only factor affecting project success, numerous reports have shown that the procurement process itself is one factor contributing to failure. As a result, Public Works and Government Services Canada (PWGSC), the federal government's procurement and contracting authority, in an action plan endorsed by the Treasury Board, called for the development of a new method of procurement.

To address these concerns and requirements, Benefits-Driven Procurement (BDP) has been developed by PWGSC.

BDP Principles and Objectives

Essentially, BDP is "a value-added, efficient procurement strategy and methodology for the acquisition and implementation of IT-based business solutions that will facilitate the achievement of client-defined benefits and, in so doing, contribute to the success of such projects."

BDP is an open competitive process used to select vendors that will possess contractual rights to complete all phases of IT-based investment projects. These rights are revocable and are normally reviewed at all project milestones. Renewal of these rights are conditional, not solely on delivery of a product or service, but rather the delivery of value.

BDP is an alternative to traditional methods of procurement which emphasize compliance and lowest cost rather than best value. By examining expected costs, benefits, and risks of such

investment projects, BDP measures the expected value to be received by the government from each investment option.

The objectives of BDP, as defined by PWGSC, are:

- To develop and promote a timely competitive procurement process for government and industry;

- To increase the success of the government's IT-based solutions and, consequently, the value for money attained;

- To contribute to the resolution of procurement process problems and to facilitate the implementation of the principles contained in Treasury Board's *An Enhanced Framework for the Management of Information Technology Projects*.

BDP is based upon certain principles that provide broad parameters within which a disciplined yet flexible procurement alternative to the current method may be established. PWGSC has identified three sets of principles: Core Principles, Defining Principles and Sustaining Principles. They are described below:

- *Core Principles:* These principles are based on the often-complementary roles and relationships of client departments, PWGSC contracting officials, and vendors. These principles stipulate that value for money, integrity, fairness, prudence and probity are essential in the procurement process. In addition, these principles require that the relationships of all parties be based on cooperation, where risks are identified and appropriately assigned to each party to the procurement process.

- *Defining Principles:* These principles are the same as those defined in *An Enhanced Framework for the Management of Information Technology Projects*. These principles are: Projects are aligned with, and support, business directions and priorities; Clear accountabilities are established; Project managers are developed and work within a corporate discipline; and Project management decisions are based on risk management which considers both the risks and their mitigation throughout the life-cycle of the project.

- *Sustaining Principles:* These principles deal with how BDP is performed. These principles are: Flexible procurement strategy and process that is driven by the outcomes and benefits of the project; Sound continuous risk management; Tight integration of the procurement activities with the project management process; Increased visibility of the cost element throughout the project; and Constant focus on process and organizational capability.

BDP Process

As defined by PWGSC, the BDP process is as follows:

1. The client department prepares its Business Plan and Main Estimates for expenditures in accordance with Treasury Board requirements for Program Forecasts.

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2. Once approved, the department develops a Business Case for each IT-based solution investment alternative it wishes to consider (in accordance with its Business Plan and Main Estimates). An independent third party performs a capability evaluation of the client department and a front-end risk assessment of the investment project.

3. For each project, the Business Case, capability evaluation, and front-end risk assessment is discussed with PWGSC and a recommended procurement strategy consistent with the scope, complexity and other characteristics of the project is identified. If the project typifies the characteristics for which BDP is appropriate, it is selected.

4. The results of the Business Case, capability evaluation, and front-end risk assessment, along with the recommended procurement strategy are referred to TBS for consideration. Assuming the Business Case is approved and the client department has demonstrated its capability to undertake the project, the client department and PWGSC are given delegated authority to proceed with the project within the limitations established.

5. The client department and PWGSC develop and circulate a BDP-Request for Proposal (RFP) based on the results of the Business Case and front-end risk assessment of the investment project. The RFP is circulated to vendors to solicit responses.

6. The client department evaluates each vendor's proposal in accordance with the criteria and process specified in the RFP. A vendor is selected to proceed to the next phase. Note that as part of the vendor selection process, the department's Business Case is re-validated to reflect vendor input, critique, and analysis.

7. Contract negotiations begin. Part of the negotiations deal with how risk is allocated between the government and vendor. Other arrangements are also clarified, i.e., the funding scheme including elements of price, cost, pay back, dispute avoidance mechanism, performance measures, risk management plans, etc. A contract is established and the work is authorized to proceed to the first gate.

8. At each off-ramp (which will have been previously defined in the contract), an iterative process is followed to ensure the Business Case remains valid, the risk profile has not deteriorated, and performance expectations are met. A decision is made as to whether to proceed or take the off-ramp.

9. If the off-ramp is taken, the vendor and government sever the relationship in accordance with a dispute avoidance plan set out in the contract.

10. Otherwise, this process continues until contractual expectations have been met.

REVIEW OF CURRENT US DIRECTION
IN PROCUREMENT

BACKGROUND

The U.S. federal government is undergoing a radical restructuring of its procurement processes. Large federal deficits and shrinking department budgets have forced many federal agencies to refocus their procurement processes in ways which allow them to maximize the value received from each procurement dollar. What has resulted is a new procurement philosophy that alters the way in which government agencies evaluate investment options, choose vendors, and execute contracts. This procurement philosophy is referred to as "best value" or "performance based" procurement.

Essentially, best value procurement specifies that each contractor's proposal is to be evaluated in terms of the expected value to be received by the government upon implementation and operation of the terms and conditions of the proposal. Prior to vendor selection, agencies must quantify the value or worth of each contractor's proposal via a risk assessment of individual proposal areas in order to determine the overall merits of each proposal. After evaluating and comparing each proposal, the government selects that which has the strongest likelihood of delivering the best value to the government.

This philosophy has received new emphasis in recent years, as embodied in the Federal Acquisition Streamlining Act (FASA) of 1994 and Executive Order 12931. This order implements the recommendations of the National Performance Review (NPR) which suggested that the government recognize quality factors in addition to price as well as develop "best practices" guidance to facilitate the use of best value procedures. Other relevant regulations and statutes that mandate the use of performance-based procurement are:

- The Clinger-Cohen Act of 1996: The Clinger-Cohen Act (also known as Information Technology Management Reform Act) focuses on capital planning and performance-based management of major IT investments.

- Government Performance Results Act (GPRA) of 1993: This act provides for the establishment, testing, and evaluation of strategic planning and performance measurements in the Federal government.

Performance-Based Procurement Guidelines

In response to the new requirements outlined in the regulations and statutes described above, the Office of Federal Procurement Policy (OFPP) at the OMB has issued a guide to best practices for performance-based service contracting. This guide was designed to help federal agencies develop policies and procedures for implementing performance-based procurement processes for service contracts that satisfy regulatory and statute guidelines. Note that these guidelines are also quite applicable to capital investment contracting as well. In fact, they have been used and modified by many U.S. federal agencies to give direction to managers in evaluating and selecting capital related investment options. Essentially, this guide defines two elements that are necessary for a procurement process to be performance-based. These elements are:

- A Performance Work Statement

- A Quality Assurance Plan

Performance Work Statement (PWS)

Prior to developing a PWS, the OFPP recommends that the department or agency conduct a "Job Analysis". Job Analysis involves identifying the agencies needs, the kinds of options that are available, and the types of outputs or results expected to be provided by the contractor. This is important because the outputs or results identified in the Job Analysis will form the basis for the performance requirements written into the PWS and verified through the Quality Assurance Plan.

The key elements of a PWS are: a statement of the required services in terms of output, a measurable performance standard for the output, and an Acceptable Quality Level or allowable error rate. These will all have been developed or identified during the Job Analysis phase. The PWS describes the specific contract requirements the vendor must satisfy in performance of the contract. It also defines the standard of performance expected from each required task.

Quality Assurance Plan (QAP)

A Quality Assurance Plan, which corresponds to the stated performance standards and measures, is needed to determine if contractor services meet the PWS requirements. The QAP also ensures that a review protocol is set up to verify the performance criteria are met. Therefore, any criteria listed in the PWS will be reviewed using the QAP after the contract is awarded during the life cycle of the project.

A QAP should clearly indicate both the surveillance schedule and method to be used. It should focus on the quality, quantity, and timeliness of the performance results to be delivered as opposed to the method in which they are to be delivered.

These OFPP guidelines have been used also as a guide for both service contracting as well as capital investment contracting. Though the guidelines were originally intended only for service-related projects, they have been modified and used by many federal agencies for use in capital-related investments as well. Most of the principles relating to best-value or performance-based contracting implied in these guidelines are applicable to procurement processes, in general.

In the OFPP guidelines, the procurement process centers around a complete analysis of the investment options. This analysis involves examination of expected costs and benefits as well as relevant risk factors inherent in the implementation and operation of the investment project. Agencies quantify the expected value or worth relating to each proposal and choose that which has the greatest likelihood of delivering best value to the government

BUSINESS CASE METHODOLOGY, ANALYSIS AND RESULTS

This Appendix is presented in four sections and three Annexes. Section C1 presents the methodological framework within which the BTP business case is examined, including the framework for risk analysis. Cost and schedule analysis and projections are given in Section C2 while Section C3 follows with the analysis and outlook for benefits. Risk analysis and business case outcomes are presented in Section C4.

The three annexes provide detailed technical documentation. Annex C-I displays the full specification of the Business Case Assessment Model. Annex C-II gives the membership of the two risk analysis panel sessions conducted in January 1999. A comprehensive listing of all assumptions, forecasts and risk assessments used in executing the business case analysis is given in Annex C-III.

C1 METHODOLOGICAL FRAMEWORK

The methodological framework consists of six elements, as follows:

1. Business case evaluation criteria;

2. Specification of the base case;

3. BTP definition;

4. Business model development;

5. Model Quantification and Risk Analysis; and

6. Business Case Assessment

Business Case Evaluation Criteria

Two principal assessment criteria are used to gauge the business case for Net Present Value (NPV), one a measure of worth (value for money), the second a measure of timing. The key measure of worth is "net present value," defined as the present-day value of total life-cycle costs minus the present-day value of total life-cycle benefits. A positive net present value means that the project earns more than the opportunity cost of capital and thus yields value for money to the province and MCSS clients. A negative NPV implies the opposite. The timing criterion asks whether an estimated positive NPV (positive net benefits) is likely to be achieved earlier or later

in the project's life-cycle. The expectation of early net benefits implies less risk of business failure than would the expectation of later net benefits.

Base Case Definition

The base case is defined as the hardware, software and business processes that would most likely to be in place if BTP were not to be implemented. The base case reflects on-going initiatives to enhance MCSS productivity and effectiveness in the administration of social assistance, including the ASAP investment program.

BTP Definition

The analysis framework defines the BTP project in relation to the goods and services to be acquired in its development, implementation and operation. In contrast, the "Service Delivery Model (SDM)" defines BTP according to engineering system design criteria, a definitional framework that reflects "functionality" rather than goods and services. The business perspective however requires the assignment of costs and benefits to the specific hardware, software, design, training, administrative and maintenance goods and services to be purchased in developing and executing the system design.

The business perspective must of course recognize the underlying design framework within which BTP goods and services are employed; it is the design framework that will determine the nature and magnitude of BTP benefits. The project definition, presented in Table 1, provides a cross-reference between ten functional design elements (that taken together represent the total BTP system), and the goods and services required to execute each design element.

Model Development

The business case assessment model is designed to represent and quantify all cause-and-effect relationships that link BTP goods and services to their effects; benefits; costs; risks; and business case outcomes.

The business case model, displayed in Figure 1, specifies the cause-and-effect linkages between BTP goods and services and their effects on MCSS productivity, program spending, service quality and social impacts These effects are subsequently translated into monetary equivalents. The model then specifies BTP life-cycle costs following which costs and benefits are compared in relation to the business case criteria. Risk analysis is applied throughout in order to anticipate the effects of uncertain technical, economic and financial assumptions and forecasts on the business case outcomes.

Table 1: PROJECT DEFINITION FOR BUSINESS CASE ANALYSIS

FUNCTIONAL/ PROCESS GROUP	DESCRIPTION	GOODS AND SERVICES
1) Centralized Intake Screening Unit	• Change in screening process from interview to a two step (telephone plus visit) intake	• Uses ACD (Automatic Call Distribution) and Call Routing technology, Telephony Equipment with software configuration work • Consulting hours • MCSS hours
2) Automated Client Access to Information System	• Automated Client Inquiry Response	• Interactive Voice Response • Consulting hours • MCSS hours
3) Automated Income Reporting System (via IVR)	• Automated Client Earnings Reporting	• Interactive Voice Response • Consulting hours • MCSS hours
4) External Database Interfaces	• Access to Verification Information outside of MCSS e.g., Revenue Canada, EI, CPP, Equifax • Requires Agreements with Information Holders	• Mainframe, Database, Custom Interface software • Consulting hours • MCSS hours
5 a) Case Management – Employment Assistance	• Redesign of OWT interfaces to provide improved and simplified data capture and usability	• Replace OWT software, Data Capture, Look up of Data (e.g. supports, jobs) • Consulting hours • MCSS hours
5 b) Case Management – Financial Assistance	• Automation-Letter, Forms, Bring Forwards, Auto-Holds/Terminate • Process: Eligibility Reviews, Client Changes, Intake Verification	• Primarily software application development • Consulting hours • MCSS hours
6) Centralized File Management and Eligibility and Entitlement Calculation Software	• Centralized data repository and the application to determine eligibility and calculate entitlements including overpayment and arrears calculation, and tax table.	• Centralized (actual or virtual) database, custom eligibility and entitlement engine • Consulting hours • MCSS hours
7) Priority-Based Assessment System	• Automated client priority assessment and eligibility review • Organizational change in staff focus (e.g. prioritize work vs. sequential work)	• Automation technology • Process change and software application design • Consulting hours • MCSS hours

Table 1: PROJECT DEFINITION FOR BUSINESS CASE ANALYSIS (con't)

FUNCTIONAL/ PROCESS GROUP	DESCRIPTION	GOODS AND SERVICES
8) Performance Management System	• Development of management reports, standards, triggers/thresholds, and actions • Summarizes Key Performance Indicators including service performance effects • Change in supervisory focus	• Database Access and report creating technology • Requires shift to performance oriented culture (e.g. the use of empirical data to manage issues/risks) • Consulting hours • MCSS hours
9) Payment and Financial System	• Payment production • DBD Financial Linkages • Overpayment Collection • Financial housekeeping (General Ledger etc.)	• Developed from off the shelf technology i.e. SAP/Peoplesoft (Basecase CIMS) • Mass reporting – Payments • Mainframe processing • Consulting hours • MCSS hours
10) Disability Adjudication Unit	• Process to make more consistent the application of disability eligibility	• Organizational Change • Process Change • Tracking Software • Consulting hours • MCSS hours

Notes to table:
1) Change Reporting 2 consists of auto-holds. This software, a subset of 7) Case Management Software, has been introduced as a stand-alone component and will be incorporated into the SDM.
2) Tax Tables consists of an automated calculation which adjusts clients tax status. This software, a subset of 7) Case Management Software, has been introduced as a stand-alone component and will be incorporated into the SDM.
3) Consolidated Verification Process (CVP) is the process change component of the Priority-Based Assessment System, and will be broadened within the SDM (i.e. assessment will be conducted during Intake Verification and the process will be automated).

FIGURE 1: BTP BUSINESS CASE MODEL DESIGN

Level 1

BTP Goods and Services
(Hardware, Software, Business
Process Redesign)

Base | BTP | Architecture Technology Data | 1A

1C

Base | BTP | Business Process | 1B

Level 2

Implementation
Services

BTP | Implementation/Training/Ramp-up/Roll Out | 2

2B

Level 3

Effects/
Effectiveness

Base | BTP | Administrative Productivity Performance Effects
___
metric a
metric b
metric c
etc. | 3A

Base | BTP | Program Payment Performance Effects
___
metric a
metric b
metric c
etc. | 3B

Base | BTP | Service Quality Performance Effects
___
metric a
metric b
metric c
etc. | 3C

Base | BTP | Social Effects
___
metric a
metric b
metric c
etc. | 3D

Level 4

Value of
Effects
(Benefits)

Base | BTP | Dollar-Valuation of Productivity Effects | 4A

Base | BTP | Dollar-Valuation of Payment Savings | 4B

Base | BTP | Dollar-Valuation of Social Effects | 4D

Level 5

Capital Costs

Base | BTP | Capital Costs | - Sunk -Design -Build -Test | 5

Level 6

O & M Costs

Base | BTP | Life-Cycle Costs | - Sunk -Operation -Maintenance | 6A

6B

Level 7

Business Case
Outcome

BTP | Net Present Value; Annual Net Benefits; Pay-Back; Rate of Return; Annual Rate of Return | 7

Level 8

Allocation of
ROI

BTP | Multi-Party ROI; CPP Financial Arrangement: Outcomes | 8

Level 9

Risk Analysis

BTP | Probability Assessment for Each Business Case Outcome | 8A

BTP Effects and Benefits. As shown in Level 3 of the model in Figure 1, goods and services are linked to BTP effects in four categories:

- Administrative productivity;

- Program expenditures;

- Client service quality; and

- Social impacts.

BTP is designed to improve administrative productivity in various ways. Automation is expected to permit workers to conduct more case-related tasks (intake, eligibility monitoring and so on) per hour and to require fewer overhead support services. Program expenditures are expected to decline as a result of more timely and accurate casework, including more accurate detection of non-legitimate eligibility applications and benefit claims and earlier detection of cases for termination.

BTP is designed to improve client services in relation to the complexity, timeliness and accessibility of the application process, the accuracy and on-time receipt of payments, and so on. Social impacts are expected to follow accordingly in the form of more ready access to health and nutritional needs and the ability to spend more time in the search for productive work in lieu of time spent in the social assistance bureaucracy.

The model framework identifies operational measurement metrics in each of the four categories. The metrics are "operational" in the sense that they lend themselves to quantification and subsequent valuation in Level 4 of the model. The operational metrics are presented in Figures 1A, 1B, 1C and 1D.

Costs and Business Outcomes. Levels 5 and 6 of the model represent BTP capital and operating costs, respectively, while Levels 7, 8 and 9 represent the overall business case outcomes including business case outcomes for each of the two parties and the business case risk analysis.

Roll-out, Ramp-up and Steady-State Effects. The model framework distinguishes between steady-state effects and costs on the one hand, and the time needed to achieve such effects and realize the costs on the other. As shown in Figures 2A and 2B (for benefits and costs, respectively), the model distinguishes between, (i) the time needed to complete the development and roll-out process and thus "start-up" a new BTP project element, (ii) the time needed to "ramp-up" the element up to a fully

BTP	Effect 1: Administrative Productivity Gain due to Improved Screening *Total Number of FTEs for Intake Screening*

BTP	Effect 2: Administrative Productivity Gain due to Reduced Time to Access Case Files: *Total Number of FTEs to Access Case Files*

BTP	Effect 3: Administrative Productivity Gain due to Improved Verification *Total Number of FTEs for Verification*

BTP	Effect 4: Administrative Productivity Gain due to Automated Letters and Forms: *Total Number of FTEs to produce Letters and Forms*

BTP	Effect 5: Administrative Productivity Gain due to Automated Overpayment Calculations:*Total Number of FTEs to Perform Overpayment Calculations*

BTP	Effect 6: Administrative Productivity Gain due to a Reduction in Time Answering Questions: *Total Number of FTEs to Answer Questions*

BTP	Effect 7: Administrative Productivity Gain due to Income Reporting via IVR: *Total Number of FTEs for Income Reporting*

BTP	Effect 8: Administrative Productivity Gain due to Elimination of ODSP Financial Assessment: *Number of FTEs for Disability Adjudication Unit*

BTP	Effect 9: Administrative Productivity Gain due to Organization Redesign: *Number of FTEs for OW Employment Supports*

BTP	Effect 10:Administrative Productivity Gain - Performance Management System: *Number of FTEs*

BTP	Total Administrative Productivity Gain: *Administrative FTEs for the Subject Tasks*

Difference Between Base and BTP is Savings

```
BTP
     Effect 11:  Program Savings due to Increased Recovery of Benefit
     Overpayment for Clients Transferring Programs Number of Overpayment
     Cases Captured per year


BTP
     Effect 12: Program Savings due to a Reduction in the Acceptance
     Rate of Ineligible Cases: Number of Ineligible Cases Accepted per year


BTP
     Effect 13: Program Savings due to Reduction in Entitlement
     Overpayment: Number of Cases with Incorrect Entitlement Detected


BTP
     Effect 14: Program Savings due to Disability Determination: Number of
     ODSP Expenditures


BTP
     Effect  15: Program Savings - Performance Management System:
     Number of Overall Payments


BTP
     Total Program Savings due to a Reduction in Total Number of
     Overpayments and Ineligible Cases Receiving Entitlements per year
```

Difference Between Base and BTP is Savings

BTP

Effect 16: Reduction in Ineligible Clients Receiving Entitlements *Number of Correct Eligibility Decisions made as a Percentage of Total Eligibility Decisions (%)*

BTP

Effect 17: Reduction of Incorrect Records due to Centralized File Management; *Number of Cheques Distributed to the Correct Address on Record as a Percentage of Total Cheques Distributed (%)*

BTP

Effect 18: Reduction in the Distribution of Incorrect Entitlements *Number of Payment Cheques Written in the Correct Amount as a Percentage of Total Cheques Written (%)*

BTP

Effect 19: Reduction in Late Cheques *Number of on Time Cheques as a Percentage of Total Cheques Distributed (%)*

Difference Between Base and BTP is Savings

FIGURE 1D: SOCIAL IMPACT EFFECTS

	Time Cost Savings	Out of Pocket Cost Savings	Intangible Benefits
1. Intake			
Telephone Screening			
Custom Calls	Travel time saved in both directions for applicants and additional non-professional helpers. Also, time saved by not waiting in office and queues.	Saved travel costs and baby-sitting costs for applicants with dependent children, and without sitter.	New referral service on telephone will save time by directing applicant to the right service, including those outside BTP.
Intake Verification			
Phone time	Time saved by not waiting at home. Also, re-applicant's time saved by not re-entering their data.		With faster financial verification, there will be more time for employment counseling that improves job-hunting success.
3rd party information verification	Client's time saved by having on-line external links. They don't have to visit other offices to get required records.	Saved travel costs and baby-sitting costs for applicants with dependent children and without sitter	Societal benefit from more time devoted to take care of children
Case Management			
Client Enquiries	Time saved for the proportion of clients that no longer need to go to office to check status.	Saved travel costs and baby-sitting costs for applicants with dependent children and without sitter	Belief that the new system is more subjective and reliable brings social benefits of less worry and aggravation.
Changes in Circumstances	Time saved for office visit for those who have changed circumstances that requires the updating of records.	Saved travel costs and baby-sitting costs for applicants with dependent children and without sitter	Confidence gained from client's ability to serve themselves
Eligibility Payment			
Standardized processing			Public confidence in integrity of system
Over/Underpayment reduction	Welfare gained by making full payment on time.		Repaying overpayment and interest may be hardship for some clients.

operational state through training, the shake-out of bugs and so on, and (iii) the steady-state level at which the element will perform beyond the ramp-up period.

Quantification and Risk Analysis

The detailed cause-and-effect relationships that link BTP goods and services to their effects and costs are specified in detailed structure and logic models and subsequently coded for computer simulation. Figure 2 presents an example; the full array of structure and logic models is given in Annex C-I.

Each variable in the structure and logic models is quantified for each year in the project life-cycle (1996 to 2003, the fullest life of the BTP CPP agreement). In order to account for uncertainty and facilitate risk analysis, each variable is given three annual values, the median expected outcome and a range defining the 80 percent probability interval associated with median. Figure 4 gives an example. The risk analysis framework and computer program called RAP (Risk Analysis Process) is used to translate the three values (known as "risk markers") into associated probability distributions, as shown in Figure 4A.

Median values for each variable in the model are drawn from data developed by the BTP team in the course of various task orders, with particular reference to the work conducted under Task Order 4 and subsequent MCSS updates. The 80 percent probability ranges are developed in two steps. Step 1 is a risk assessment for each variable conducted by HLB staff engineers and economists.

With a view to obtaining stakeholder input and consensus on the models and risk assessments, Step 2 involves facilitated panel scrutiny of both the HLB structure and logic models and the HLB risk assessments. Two panel sessions (RAP Sessions[c]) were conducted. The first session was devoted to the structure and logic models (January 18, 1999). The second (January 28, 1999) focused on the risk assessments. Panelists were drawn from senior BTP management representing both MCSS and Andersen Consulting. Table 2 presents the factors used by HLB and panelists as the basis for assessing and quantifying uncertainty ranges for each variable. Annex C-II lists the participants in each of the two panel sessions.

Business Case Assessment

Once the structure and logic models are specified, quantified and scrutinized, business case results are obtained. Computer simulation of the model framework is used to generate ten thousand possible outcomes based on random simulations from the risk assessments for each variable in the model (the process, called Monte Carlo simulation, is illustrated in Figure 5). The frequency with which outcomes occur and

BENEFIT RISK FACTORS
- DESIGN/ROLL-OUT   - SHAKE-OUT   - HUMAN FACTORS   - LABOUR RELATIONS   - OBSOLESCENCE   - FISCAL PRIORITIES   - FUNCTIONALITY   - SOCIAL POLICY   - PARTNERING   - SKILL MIX AND TIMING   - STAFF TURNOVER   - MEASUREMENT RISK

DESIGN/ROLL-OUT
- **Lower 10 Percent.** Probability that strengths in design/roll-out or prototyping will accelerate development and thus *accelerate start-up;*
- **Upper 10 Percent.** Probability that weaknesses in design and/or roll-out or prototyping of architecture/ technology/business process will delay initiative development and thus *delay start-up.*

SHAKE-OUT
- **Lower 10 Percent.** Probability that performance strengths will **shorten ramp-up;**
- **Upper 10 Percent.** Probability that performance deficiencies with newly in-place technologies or business processes will **lengthen ramp-up.**

HUMAN FACTORS
- **Lower 10 Percent.** Probability that strengths in learning, acceptance and take-up strategy, or higher than expected worker reception levels **will shorten ramp-up;**
- **Upper 10 Percent.** Probability that weaknesses in learning, acceptance and take-up strategies and lower than expected worker reception levels **will lengthen ramp-up.**

LABOUR RELATIONS
- **Lower 10 Percent.** Probability that strong labour relations will *shorten start-up* and *reduce ramp-up;*
- **Upper 10 Percent.** Probability that provincial labour unrest will *delay start-up* or *lengthen ramp-up.*

•

TABLE 2: OVERVIEW RISK ASSESSMENT FACTORS (con't)

OBSOLESCENCE
- **Lower 10 Percent.** Probability that stable technology will *increase steady-state* performance;
- **Upper 10 Percent.** Probability that rapid technological change will lengthen initiative development, *delay start-up* or *lengthen ramp-up*.

FISCAL PRIORITIES
- **Lower 10 Percent.** Probability that budgetary shifts will accelerate development, *accelerate start-up* or *shorten ramp-up*;
- **Upper 10 Percent.** Probability that shifts in fiscal and budgetary priorities will delay initiative development and *delay start-up* or *lengthen ramp-up*.

FUNCTIONALITY
- **Lower 10 Percent.** Probability that weaknesses in functionality will *diminish steady-state.* Probability that innovation and strength in functionality will *shorten ramp-up;*
- **Upper 10 Percent.** Probability that weaknesses in functionality will *increase steady-state.* Probability that innovation and strength in functionality will *lengthen ramp-up;*

SOCIAL POLICY
- **Lower 10 Percent.** Probability that stable social policy will **accelerate start-up, or shorten ramp-up.** Probability that changes in eligibility or entitlement policy will shift administrative requirements beyond BTP functionality and thus **diminish steady state**;
- **Upper 10 Percent.** Probability that stable social policy will **increase steady state**. Probability that changes in eligibility or entitlement policy will shift administrative requirements beyond BTP functionality and thus **delay start-up, or lengthen ramp-up.**

PARTNERING
- **Lower 10 Percent.** Probability that weaknesses in vendor/ government risk-sharing relationship will lengthen initiative development and thus *diminish steady-state.* Probability that strengths in vendor/government risk sharing relationship will accelerate development and thus *accelerate start-up, shorten ramp-up*;
- **Upper 10 Percent.** Probability that weaknesses in vendor/government risk-sharing relationship will lengthen initiative development and thus *delay start-up, or lengthen ramp-up.* Probability that strengths in vendor/government risk sharing relationship will accelerate development and thus *increase steady-state*.

FIGURE 2A: TIMING FRAMEWORK FOR EFFECTS AND BENEFITS

	ARCHITECTURE	SPECIFICATION	COTS OR CUSTOM
Level 1	Hardware	Hardware Mode	COTS (Custom off the Shelf)
	Software	Software Mode	COTS with some Customization
	Business Process	BPR Mode	
Level 2	Training/Integration	Training Mode	All Custom

START-UP
Median: Expected Month/Year of Initiation
Risk Markers: 10 percent lower bound; 10 percent upper bound

RAMP-UP
Median: Expected Months to Steady-State
Risk Markers: 10 percent lower bound; 10 percent upper bound

Level 3

STEADY-STATE EFFECTS
Median: Percent Increase or Decrease in Metric
Risk Markers: 10 percent lower bound; 10 percent upper bound

Level 4

BTP BENEFIT
Median: Monetary Value of Effect
Risk Markers: 10 percent lower bound; 10 percent upper bound

FIGURE 2B: TIMING FRAMEWORK FOR COSTS

Level 1

ARCHITECTURE	SPECIFICATION	COTS OR CUSTOM
Hardware	Hardware Mode	COTS (Custom off the Shelf)
Software	Software Mode	COTS with some Customization
Business Process	BPR Mode	
Training/Integration	Training Mode	All Custom

Level 2

DISCOUNT/INTEREST RATE
Median
Risk Markers: 10 percent lower bound; 10 percent upper bound

PROJECT LIFE
Median
Risk Markers: 10 percent lower bound; 10 percent upper bound

Level 5 and 6

COSTS

	CAPITAL COSTS	IMPLEMENTATION/ TRAINING	CAPITAL REFRESH	O&M
SUNK	Year 1, Year 2, Year t	Year 1, Year 2, Year t	Year 1, Year 2, Year t	Year t through n
GOING FWD	Year 1, Year n+1, Year t	Year 1, Year n+1, Year t	Year 1, Year n+1, Year t	Year t through n

Median: Percent Increase or Decrease in Metric
Risk Markers: 10 percent lower bound; 10 percent upper bound

Level 7 and 8

BTP BUSINESS CASE OUTCOMES
Return on Investment
First-Year ROI
Net Present Value
Pay-Back

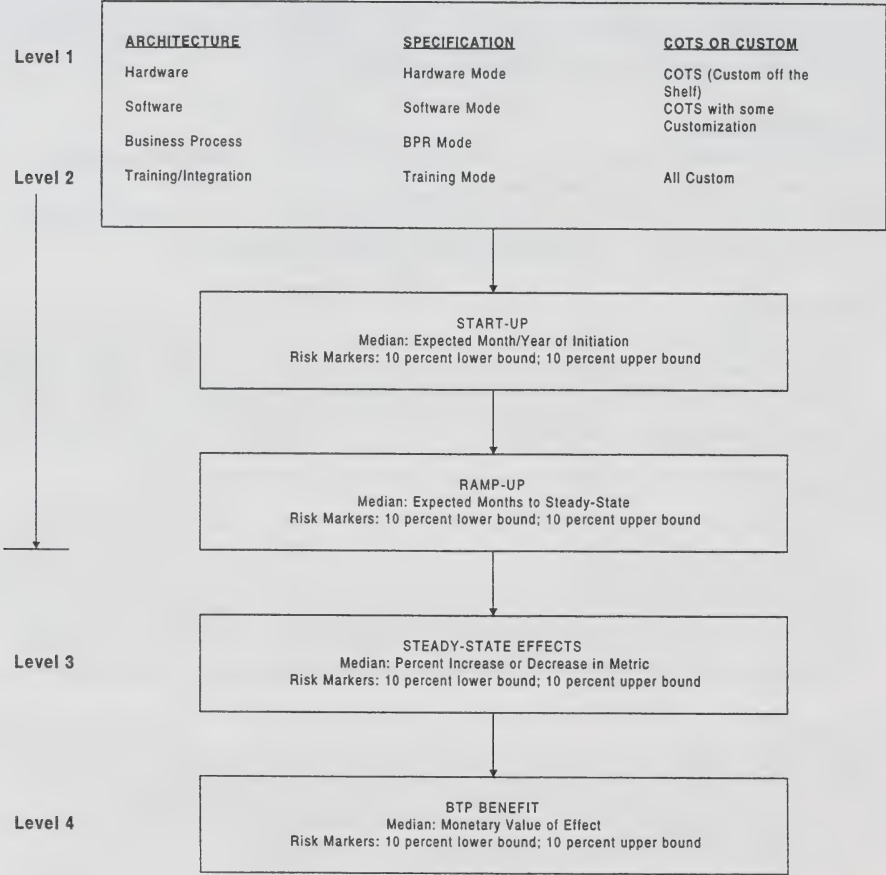Median, Mean, Probability Range

Level 9

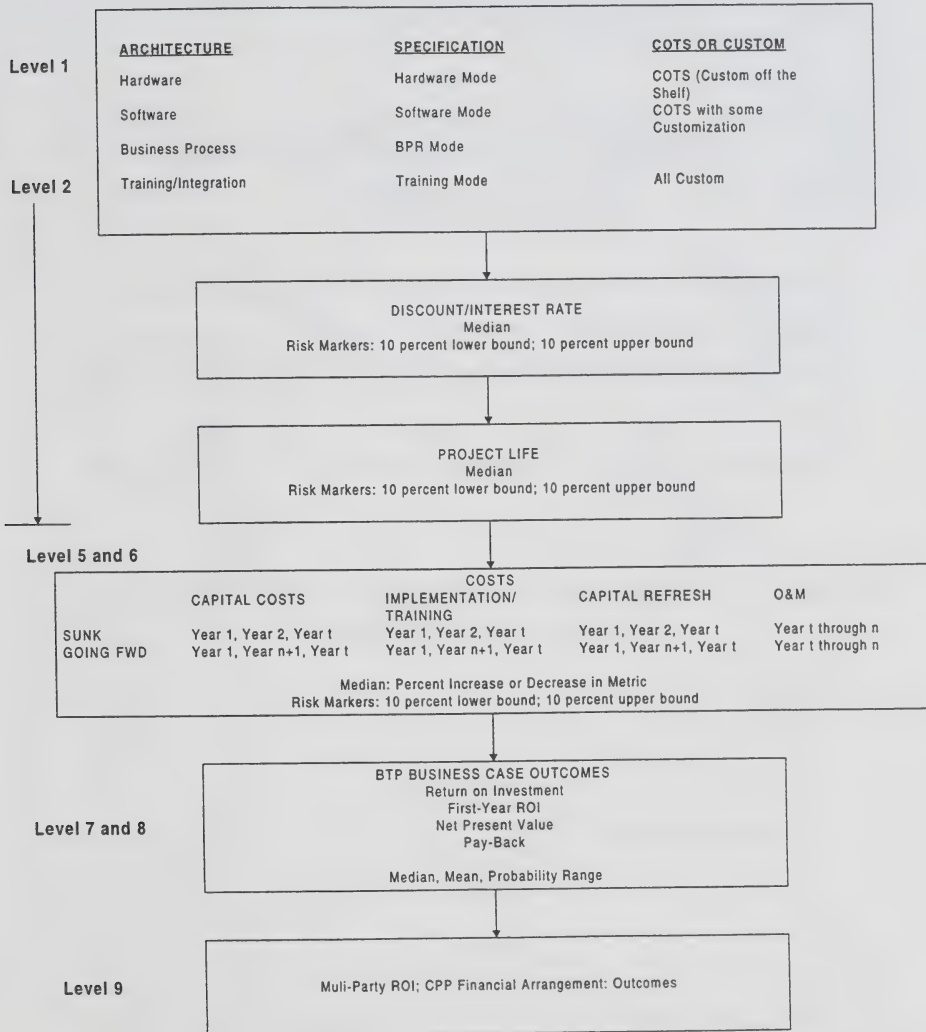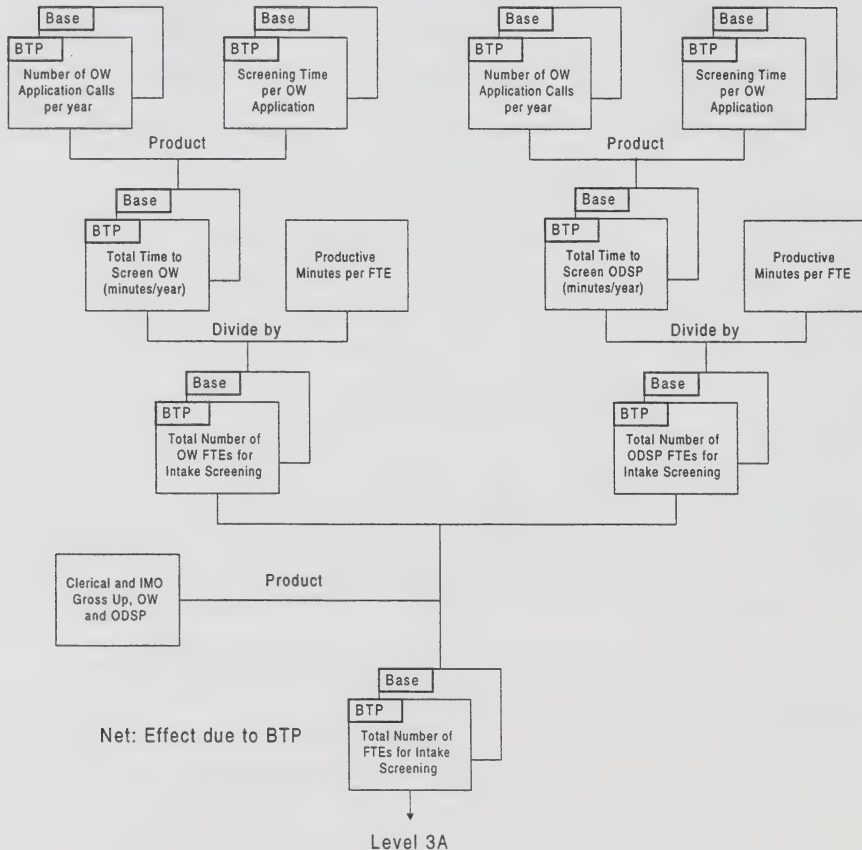Muli-Party ROI; CPP Financial Arrangement: Outcomes

FIGURE 3: EXAMPLE OF SUB-MODEL STRUCTURE AND LOGIC

Functional/Process Group: Intake
BTP Integrated Sub-Initiative: Centralized Intake Screening Unit

Effect 1:   Administrative Productivity Gain Due to Improved Screening
Metric: Total Number of Administrative FTEs

Base		Base		Base		Base	
BTP		BTP		BTP		BTP	
Number of OW Application Calls per year		Screening Time per OW Application		Number of OW Application Calls per year		Screening Time per OW Application	

Product

Product

Base		Base
BTP		BTP
Total Time to Screen OW (minutes/year)	Productive Minutes per FTE	Total Time to Screen ODSP (minutes/year)

Productive Minutes per FTE

Divide by

Divide by

Base		Base
BTP		BTP
Total Number of OW FTEs for Intake Screening		Total Number of ODSP FTEs for Intake Screening

Clerical and IMO Gross Up, OW and ODSP   Product

Net: Effect due to BTP

Base
BTP
Total Number of FTEs for Intake Screening

Level 3A

Reference: 1.1.1 Social Assistance Blueprint - Implementation Plan and Business Case

Capital Expenditure
($millions)

MEDIAN	10% LOWER*	10% UPPER*
0.95	0.80	1.20

*** INDICATES THE UPPER AND LOWER LIMITS OF AN 80%
CONFIDENCE INTERVAL.**

Capital Expenditure
($millions)

A TECHNIQUE FOR COMBINING PROBABILITIES

Months to
90% Productivity
(months)

Training Costs
($)

Risk of
Implementation
Delay (months)

Capital
Expenditure
($)

$$F = f(A, B, C, D, ...)$$

Costs of Technological
Implementation
($)

NPV of Technological Implementation

Probability of Exceeding

Net Present Value ($millions)
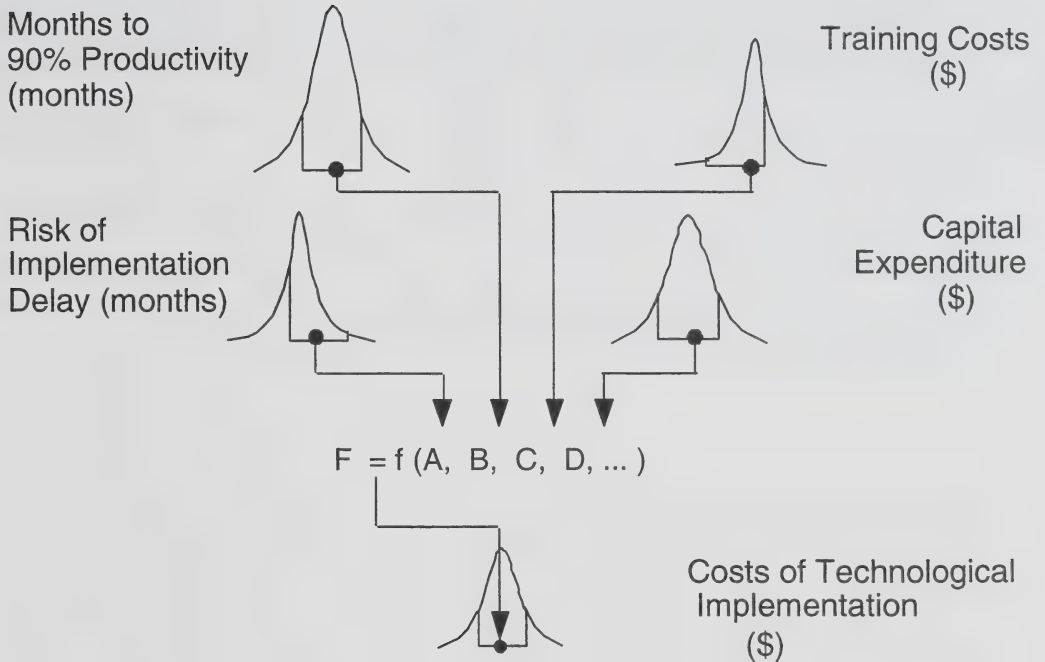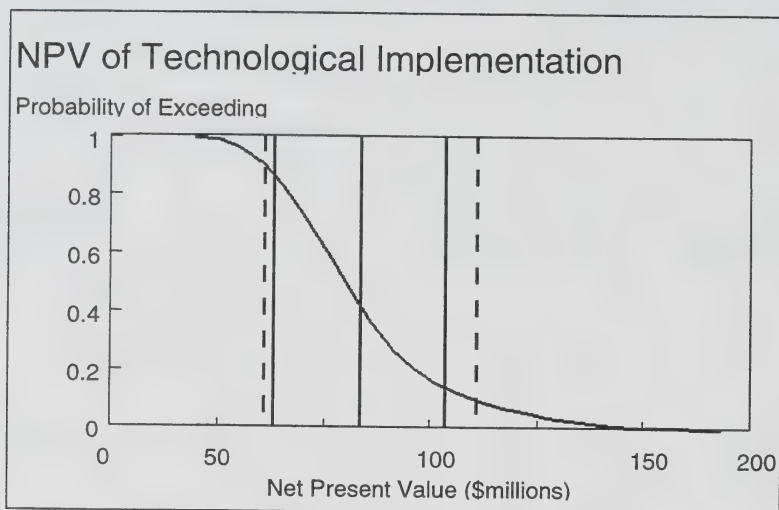
recur in the sampling process forms a probability distribution, or risk analysis, of BTP's effects, benefits, costs and business case outcomes (as illustrated in Figure 6).

BTP COST AND SCHEDULE ANALYSIS

BTP project costs consist of one-time hardware and software expenditures, on-going hardware and software leasing expenses, development and testing facility costs, operating and maintenance expenses, and hourly costs for professional services (design, project management, training and other professional service costs). Table 3 presents the median cost estimates for the year in which they are expected to occur. The median cost estimates presented in Table 3 coincide with the planned schedule for design, build, roll-out and ramp-up activities presented in Figure 7.

Risk assessments for each variable in the cost and schedule estimating models are presented Annex C-III.

BTP EFFECTS AND BENEFITS

The operational measurement metrics (Figures 1A through 1D) in each of the four BTP impact categories (productivity, program expenditures, service quality and social impacts) are translated into monetary equivalents on the basis of assumptions given in Annex C-III. These assumptions were developed by HLB and scrutinized in the second of the two stakeholder panel sessions (January 28, 1999).
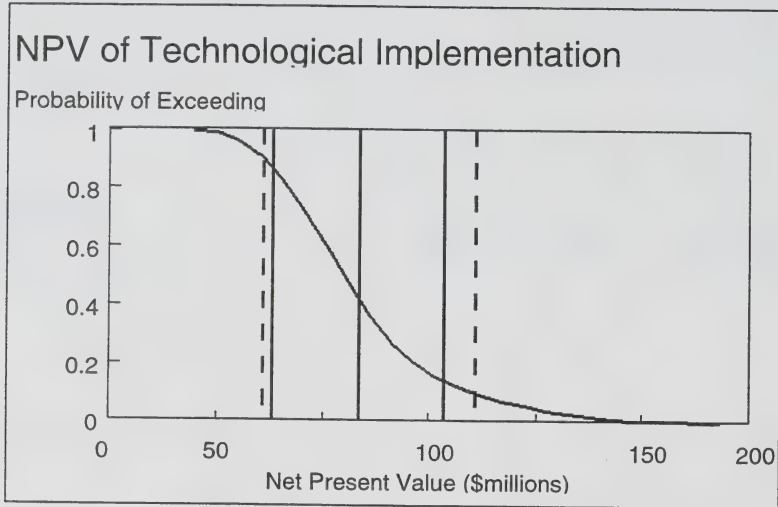
Monetary Valuation of Productivity Gains

Productivity gains are valued as the difference between MCSS FTE requirements under the base case versus the BTP case. MCSS wage rates, benefits and overheads are used to value FTE requirements, by category. Although reductions in FTE requirements may not be translated into provincial staff reductions, it is assumed that reduced FTE requirements would be translated into a more efficient allocation of staff resources within MCSS and among provincial government ministries. The alternative assumption, that excess labour requirements are not re-optimized but carried in the form of waste, cannot be justified either theoretically or by reference to the observed behaviour of governments in the face of FTE efficiency gains.

Monetary Valuation of Program Savings

Program savings are estimated on the basis of projected caseload and entitlements per case in the base case versus the BTP case. Through more effective screening, monitoring and verification, BTP is expected to reduce both caseload and entitlements per case. Annex C-III presents the median projections and risk assessments for each variable in the caseload and entitlement forecasting models.

NPV of Technological Implementation

recur in the sampling process forms a probability distribution, or risk analysis, of BTP's effects, benefits, costs and business case outcomes (as illustrated in Figure 6).

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Table 3: BTP PROJECT BUDGET
(in millions of current dollars)

	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	Total
Sunk Costs	0	0	54.5	0	0	0	0	54.5
One-Time Hardware	0	0	0	0	2.2	1.6	0	3.8
One-Time Software	0	0	0.4	2.3	1.8	0	0	4.5
Ongoing Hardware Lease	0	0	0	1.2	5.9	5.6	5.5	18.2
Ongoing Software License Fees	0	0	0	0.1	0.9	0.9	0.8	2.7
Operating and Maintenance Charges	0	0	0	2.4	7	6.7	6.5	22.6
Development Environment Costs	0	0	0.7	1.4	0.8	0.8	0.8	4.5
Person Hour Costs	0	3.7	5.8	31.4	68.2	78	36.1	223.2
Total	0	3.7	61.4	38.8	86.8	93.6	49.7	334.0

Source: BTP Project Team, December 1998
Note: Cost ecalation factors range between five and eight percent, depending upon category.

FIGURE 7: BTP PROJECT SCHEDULE

Product

- Centralized Intake Screening Unit
- Automated Client Access to Information System
- Automated Income Reporting System
- External Database Interfaces
- OW Employment Support System
- Centralized F.M. and Entitlement Software
- Case Management Software
- Priority Based Assessment System
- Performance Management System
- Payment and Financial System
- Disability Adjudication Unit

Legend:
- DESIGN/BUILD/ TEST PHASE
- PRODUCTIVITY RAMP-UP
- ROLL-OUT

Start Date - June 1997

January 2000 — January 2001 — January 2002 — January 2003

Steady-State Expected August 2003

Steady-State Expected July 2003

Whereas HLB adopted median projections of caseload effects based on estimates developed by the BTP project team, we conducted an independent analysis as the basis for the risk assessment of caseload effects.

HLB Statistical Audit of Caseload Terminations Attributable to BTP. As the basis for our independent analysis, we developed a multivariate statistical model of monthly case terminations between April 1996 and November 1998. We used this model to measure the quantitative magnitude and statistical significance of any increase in the number of monthly terminations attributable to CR1 and CR2 and to CVP "early opportunity investments" carried out under the BTP project. Our findings indicate that terminations due to CR1 and CR2 increased on average by 28 percent per month between September 1997 and November 1998. As of November 1998, however, no increase in terminations were statistically attributable to CVP. These findings led HLB to estimate a downward skew in the probability range for projected CVP benefits.

The HLB multivariate statistical model of terminations is reflected in three equations, as follows:

$$\text{LTERMIN} = \text{BETA}_0 + \text{BETA}_1 * \text{TREND} + \text{BETA}_2 * \text{STRIKE1} + \text{BETA}_3 * \text{STRIKE2} + \text{BETA}_4 * \text{CR1CR2} + \text{BETA}_5 * \text{CVP} + \text{BETA}_6 * \text{SPP} + \text{BETA}_7 * \text{OSAP} \qquad ...1$$

$$\text{LSSPTERMIN} = \text{BETA}_0 + \text{BETA}_1 * \text{TREND} + \text{BETA}_2 * \text{STRIKE1} + \text{BETA}_3 * \text{STRIKE2} + \text{BETA}_4 * \text{CVP} + \text{BETA}_5 * \text{SPP} + \text{BETA}_6 * \text{OSAP} \qquad ...2$$

$$\text{LSSPTERMIN} = \text{BETA}_0 + \text{BETA}_1 * \text{TREND} + \text{BETA}_2 * \text{STRIKE1} + \text{BETA}_3 * \text{STRIKE2} + \text{BETA}_4 * \text{CR1CR2} + \text{BETA}_5 * \text{CVP} + \text{BETA}_6 * \text{SPP} + \text{BETA}_7 * \text{OSAP} \qquad ...3$$

where:

LTERMIN denotes Log of Total Terminations

LSSPTERMIN denotes Log of SSP Terminations

TREND denotes Linear Time Trend

STRIKE1 denotes a dummy variable for the Provincial Employee Strike set equal to one in March 1996 and zero otherwise

STRIKE2 denotes a dummy variable for the Postal Strike and Ice Storm set equal to one in December and January 1998 and zero otherwise

CR1CR2 denotes a dummy variable for the introduction of Change Reporting I and II, set equal to one from September 1997 onwards, and zero otherwise

CVP denotes a dummy variable for the introduction of CVP, set equal to one from April 1998 onwards and zero otherwise

SSP denotes a dummy variable for the transfer of the Sole Support Parents (SSP) program to OW, set equal to one in November 1998 and zero otherwise

OSAP denotes a dummy variable for the OSAP Income Preclusion of Welfare Receipts, set equal to one for September and Nov 1996 and zero otherwise

The Ordinary Least Squares results are given in Table 4. Equation 1 explains 80.2 percent of the monthly variation in total terminations between January 1996 and November 1998. The trend term indicates a downward trend in terminations of 1.6 percent per month, after allowing for strikes and other "shocks." The introduction of CR1 and CR2 is measured to yield a statistically significant coefficient that translates into a 28 percent monthly impact on terminations (the calculation is $(e^{0.246} - 1) * 100 = 27.9$ percent). The coefficient for CVP, on the other hand, is statistically insignificant. Equations 2 and 3, which restrict the sample to the SSP caseload, still indicate a statistically insignificant effect of CVP on case terminations.

The results outlined above do not necessarily imply that CVP has failed to generated positive results on SSP terminations. A full year or so of experience may reasonably be required in order to ascertain such proof. The absence of confirmed CVP benefits as of November 1998 is thus notable though not alarming.

Table 4 Ordinary Least Squares Results for Equations 1-3 (January 1996-November 1998)

Independent Variable	Coefficient and t-ratio		
	Equation 1	Equation 2	Equation 3
Constant	8.722 (192.041)	8.184 (115.783)	8.276 (121.921)
Trend	-0.016 (-4.609)	-0.008 (-1.851)	-0.020 (-3.742)
Strike1	-0.610 (-6.212)	-0.530 (-3.162)	-0.587 (-3.999)
Strike2	-0.230 (-3.016)	-0.196 (-1.570)	-0.309 (-2.709)
CR1CR2	0.246 (3.782)		0.309 (3.178)
CVP	0.052 (0.873)	0.017 (0.167)	-0.020 (-0.226)
SSP	0.422 (4.288)	0.657 (3.900)	0.704 (4.786)
OSAP	0.301 (5.247)	0.417 (4.233)	0.422 (5.149)
Diagnostic Statistics			
R^2	0.802	0.670	0.760
F – Statistic	15.645	9.481	12.212
Durbin-Watson Statistic	1.687	1.305	1.306

Monetary Valuation of Social Impacts

The projected social impacts of BTP are estimated on the basis of client time savings (in hours) and the economic value of these time savings (in dollars per hour). The methodology for estimating client time savings is given in Table 5.

The hourly economic value of client time savings is assumed to be reflected in the provincially established minimum wage level of $6.85 per hour. This assumes that the minimum wage level reflects the provincial government's belief regarding the average opportunity cost of time among individuals who bear the risk of requiring social assistance. An alternative valuation assumption would equate the social value of time with the average entitlement per case under the ODSP and OW programs. On a per hour basis (taken over an eight hour day), the combined ODSP and OW social assistance rate averages $6.27 per hour. However, since the differential between this rate and the minimum wage embodies a financial incentive for recipients to return to the workforce as soon as possible, it is assumed here that the more accurate reflection of social value is embodied in the minimum wage level.

Central forecasts, presented in Table 6, indicate that BTP will yield an additional $53.9 million in annual social benefits to recipients of OW and ODSP once BTP has reached steady-state performance. The present value (in 1996) of these benefits is $49.5 million.

BUSINESS CASE OUTLOOK AND RISK ANALYSIS

Expected business returns -- returns arising under central forecasts of BTP costs, schedule and performance – are evaluated in terms of (i)life-cycle net benefits; (ii) return on investment and timing; (iii) net benefits at "steady-state" (full BTP functionality); (iv) the effect of cost sharing with the private sector; and (v) risk.

Table 5: Valuation of BTP Social Impacts - Methodology

	Time Cost Savings	Out of Pocket Cost Savings	Intangible Benefits
1. Intake			
Telephone Screening			
Custom Calls	Travel time saved in both directions for applicants and additional non-professional helpers. Assumes help can be obtained on phone or from home. Also, time waiting in office and queuing is eliminated.	Saved travel costs and baby-sitting costs for applicants with dependent children, and without sitter.	New referral service on telephone will save time by directing applicant to the right service, including those outside BTP.
Intake Verification			
Phone time	For those not screened out, and had a home visit, will no longer need to wait at home. Also, re-applicants will already have their data in databases		With faster financial verification, there will be more time for employment counseling that improves job-hunting success.
3rd party information verification	Clients that don't have the required forms must visit, on average 3 offices. The estimate of custom call time cost times 3 is used to estimate time saved by having on-line external links	Saved travel costs and baby-sitting costs for applicants with dependent children, and without sitter	
2. Case Management			
Client Enquiries	Estimated 10% of clients will not need to go to office. The calculation of saved cost of a visit is the custom call time cost proportioned by number of cases.	The saved cost of visit is the Custom call out-of-pocket cost proportioned by number of cases.	Belief that the new system is more subjective and reliable brings social benefits of less worry and aggravation.
Changes in Circumstances	Those who have changed circumstances save the cost of a visit. The calculation uses the custom call time cost proportioned by number of cases.	The saved cost of visit calculation uses the custom call out-of-pocket cost proportioned by number of cases.	
3. Eligibility Payment			
Standardized processing			Public confidence in integrity of system; proper safety net; ability to serve selves; more time to take care of children
Over/Underpayment reduction	An estimated 6% got at least one underpayment in the year. The calculation of average welfare loss uses the proxy of the minimum wage for the period the outstanding amount is delayed.		With an average 5% and maximum 10% interest rate there may be hardship for some to payback an overpayment.

Table 6: Valuation of BTP Social Impacts – Results (in dollars per year)

SDM Functional Areas	Time Cost Savings	Out-of-Pocket Cost Savings	Incremental Social Benefit ($)
1. Intake			
Telephone Screening			
Custom Calls	11,174,063	8,705,357	19,879,420
Intake Verification			
Phone time	2,216,725		2,216,725
3rd-Party Information Verification	14,063,906	7,734,375	21,798,281
2. Case Management			
Client Enquiries	503,475	860,417	1,363,892
Changes in Circumstances	4,027,800	3,412,500	7,440,300
3. Eligibility Payment			
Standardized Processing			
Over/Underpayment Reduction	1,208,304		1,208,340
Total Incremental Social Benefit	**33,194,273**	**24,183,482**	**53,906,958**

Net Benefits

As shown in Table 7, the realization of central cost, schedule and performance projections means that the BTP investment program would yield $297.2.million in benefits net of all costs (in present-day dollars of 1996 purchasing power over the 1996-2003 life-cycle of the CPP contract, discounted at five percent per year). Benefits arise in the form of (i) productivity gains in the MCSS administration of OW and ODSP, and (ii) reductions in the volume of inaccurate payments under these programs.

Table 7: BTP Life-Cycle Business Case Results (Benefits minus Costs over the Period April 1996 to March 2003, Excluding Social Benefits)
(Present-day (1996) value, at five percent discount, in millions of current dollars)

	Expected Outcome	There is a One Percent Probability that NPV will be:	There is a Five Percent Probability that NPV will be:	There is an 80% Probability that NPV will be:
Net Benefits (NPV)	$297.2m	($8.2m)	$42.9m	$150.3m

Notes:
1) Base caseload of 591,000 cases in 1996/1997, using September 1998 forecast.
2) Labour rates include annual escalation factors of 8% for Andersen Consulting and sub-contractors, and 5% for MCSS and sub-contractors (applies to costs and benefits).
3) Cost information based on Andersen Consulting supplied workdays.
4) Schedules developed during January 28 Session.
5) 30% of the active caseload is assumed to have an overpayment under base and BTP figures.

As shown in Table 8, the business benefits of BTP are manifest in improved quality of service to OW and ODSP recipients.

Table 8: BTP Service Quality Effects (at Steady-State)

Service Quality Performance Indicator	Without BTP	With BTP	Effectiveness Improvement
Percent of Eligibility Decisions Made Correctly	94.5%	95.9%	1.5%
Percent of Payments Made in the Correct Amount	72.8%	90.6%	24.5%
Percent of Social Assistance Payments Made on Time	95.5%	98.4%	3.0%

Return on Investment

Central projections indicate a cumulative seven-year return on BTP investment of 222 percent (Table 9). High returns of this magnitude indicate that modernizing MCSS business processes is sharply overdue. Had such investment been made earlier, returns would have been lower, yet nevertheless acceptable, while Ontario taxpayers would have not have waited a protracted period of time for greater government effectiveness and efficiency in the administration of social assistance.

Table 9: BTP Return On Investment, in percent (excluding social benefits)

	Cumulative ROI at the end of year shown
1998-1999	149
1999-2000	156
2000-2001	117
2001-2002	107
2002-2003	222

The results outlined above account for gains in productivity and reduced program outlays. Central forecasts indicate that BTP will also yield an additional $49.5 million in net social benefits to recipients of OW and ODSP over the first seven years of the program (figures from Table 6 translated to present-day value at five percent discount). When the economic value of these social benefits is combined with gains in MCSS productivity and spending reductions, total net benefits rise to $346.7 million ($297.2 million plus $49.5 million).

Steady-State Benefits

The results above are reported on a life-cycle basis so as to account for lower benefits during the multi-year roll-out and ramp-up of BTP systems and business processes. Central projections

indicate that BTP processes will be operating in "steady-state" (full functionality and productivity) by year eight of the program (2004). Table 10 indicates that at that time annual benefits (excluding social benefits) will have reached $718.8 million while the major fraction of BTP costs will have been incurred in previous years. Steady-state net benefits will thus reach $694.3 million by year eight of the program.

It is noteworthy that the roll-out of "early opportunity" investments (CR-I, CR-II and CVP) has generated positive net benefits on an annual basis (for 1997/98 and 1998/99). While going forward, the BTP investment program can expect two years of negative returns, the early "banking" of positive outcomes means that cumulative rates of return remain positive in each year of the seven-year development and roll-out program (see Table 9).

Table 10: BTP Annual And Steady-State (Eighth Year) Costs, Benefits And Net Benefits (excluding social benefits)

(in millions of current dollars)

	1996-97	1997-98	1998-99	1999-00	2000-01	2001-02	2002-03	2003-04
Total Benefit in year shown	0	32.0	64.7	65.2	62.0	79.1	439.8	718.8
Total Cost in year shown	0	3.7	61.4	38.8	86.8	93.6	49.7	24.5
Net Benefit in year shown	0	28.3	3.3	26.4	(24.8)	(14.5)	390.1	694.3

Cost Sharing with the Private Sector

The results outlined above account for all BTP costs and all resulting BTP benefits. However, present CPP financial arrangements between MCSS and Andersen Consulting entitle the consultant to payments of no more than $180 million, an amount that may lie beneath the consultant's cost of delivering total BTP functionality at its present billing rates . If the consultant nonetheless delivers total functionality within the $180 million payment "Cap," net benefits from the perspective of the provincial taxpayer will exceed the $297.2 million value cited above by the difference between the Cap and Andersen Consulting's cost. From the perspective of total costs, however, regardless of whether they are borne by the taxpayer or the vendor, the net present value remains unchanged.

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Risk Analysis

The analysis reveals that a number of material risks confront BTP management in seeking to achieve the central forecasts reflected above and thus deliver positive business returns. Among these the most prominent are (i) schedule risk; (ii) the risk of failure to achieve targeted levels of effectiveness; (iii) the risk of inaccurate case load forecasts; and (iv) the risk of inaccurate assessments of the opportunity cost of capital.

Schedule Risk. A dominant risk is that of slippage in the roll-out and ramp-up of key processes and support technology. Analysis of potential slippage risk, taken together with the effects of all other risk factors, indicates a five percent probability that that BTP benefits will exceed BTP costs by no more than $42.9 million, and a one percent risk that costs will actually exceed benefits by more than $8 million – (Table 7 -- in present-day dollars of 1996 purchasing power over the 1996-2003 life-cycle of the CPP contract, discounted at five percent per year). On the other hand, sound and aggressive risk management of the schedule is found to offer substantial rewards. As compared with the baseline schedule, each month of accelerated roll-out and ramp-up yields five percent greater net benefits. While aggressive risk management and mitigation of schedule risk itself carries a cost, the business case for such activity is very high.

Effectiveness Risk and the Crystallization Process. Benefits in the form of improved productivity and reduced program outlays arise when BTP business processes trigger more effective MCSS performance in administering intake and eligibility monitoring and benefits-management activities. Delay in achieving provably greater effectiveness will delay, and weaken, business case returns.

As shown earlier, multivariate statistical analysis indicates that improved effectiveness can be confirmed in relation to the introduction CR-I and CR-II in September 1997 and that provable business and social benefits are accruing accordingly. On the other hand, statistical analysis does not yet confirm that improved effectiveness has arisen from CVP, as introduced in April 1998.

On the other hand, failure to ascertain the emergence of such proof with eight months of CVP experience should be viewed as an emerging risk and managed accordingly. Since at present the process of crystallizing effects and benefits, while rational and well documented, does not include tests of statistical proof, a such tests should be incorporated into the process as part of an improved risk management framework.

Client Base. The client base is a risk factor because the benefits of BTP are found to fall more quickly than BTP costs as the number of active cases declines (or rise more quickly with unexpected growth in the number of active cases). Although case load would need to decline substantially more than projected under even the most optimistic economic outlook in order to materially dilute the business case for BTP as it currently scoped, risk managers should recognize the link between the net benefits of BTP and the size of the case load and seek opportunities to manage the timing and scope of project outlays accordingly.

The Opportunity Cost of Capital. Results reported above assume a provincial opportunity cost of capital of five percent (in dollars of current purchasing power). While this is consistent with current market conditions, governments at times apply above-market discount rates in appraising public investments as a means of guarding against the risk of crowding-out more productive private sector investments. At a ten percent discount rate for example, the expected net present value of BTP reported in Table 7 falls from $297.2 million to $216.7 million.

Economic reasoning supports the lower discount rate in the case at-hand, however, for two reasons. First, the willing participation of a private sector firm in sharing the investment risk of BTP indicates that crowding out is not occurring. Second, economic theory supports a lower discount rate for social investments on the grounds that capital markets understate the rate at which society is willing to defer consumption in order to sustain a minimum state of health and nutrition for those in need.

Conclusion

HLB Inc. believes that the BTP investment program, in its present state of design and scope, offers a sufficiently high probability of positive business case returns and sufficiently low risk of negative returns to justify the magnitude of investment funds budgeted for the acquisition of associated goods and services.

HLB Inc. analysis indicates the need for aggressive steps to manage risk and mitigate against the effects of uncertainty, particularly in relation to, (i) adherence to the scheduled roll-out and ramp-up of BTP business processes and supporting technologies, and (ii) timely statistical proof of system effectiveness and crystallized benefit. Failure to manage and mitigate these risk poses a material risk that BTP will yield negative business case returns.

ANNEX C-I: STRUCTURE AND LOGIC DIAGRAMS OF BUSINESS CASE MODEL

Functional/Process Group: Intake
BTP Integrated Sub-Initiative: Centralized Intake Screening Unit

Effect 1:   Administrative Productivity Gain Due to Improved Screening
Metric: Total Number of Administrative FTEs

Net: Effect due to BTP

Level 3A

Functional/Process Group: Case Management
BTP Integrated Sub-Initiative: Centralized File Management and Eligibility
and Entitlement Calculation Software

Effect 2:   Administrative Productivity Gain Due to Reduced Time to Access Case Files
Metric: Total Number of Administrative FTEs

Base
BTP
Number of OW
File Accesses per
case

Base
BTP
Time to Access
File, OW

Base
BTP
Number of ODSP
File Accesses per
case

Base
BTP
Time to Access
File, ODSP

Product

Product

Base
BTP
Total Time to
Access File, OW
(minutes/case)

Total Number of
Current OW
Cases

Base
BTP
Total Time to
Access File,
ODSP
(minutes/case)

Total Number of
Current ODSP
Cases

Product

Product

Base
BTP
Total Time to
Access Files per
year, OW

Productive
Minutes per FTE

Base
BTP
Total Time to
Access Files per
year, ODSP

Productive
Minutes per FTE

Divide by

Divide by

IMO Gross Up,
OW and ODSP

Product

Net: Effect due to BTP

Base
BTP
Total Number of
FTEs to Access
Files

Level 3A

Reference: 1.2.4 Social Assistance Blueprint - Implementation Plan and Business Case

Functional/Process Group: Intake/Case Management
BTP Integrated Sub-Initiative: External Database Interfaces

Effect 3:   Administrative Productivity Gain Due to Improved Verification
Metric: Total Number of Administrative FTEs

Base		Base			Base		Base
BTP		BTP			BTP		BTP
Number of OW Application to be Verified		Duration of OW Verification process per App.			Number of ODSP Application to be Verified		Duration of ODSP Verification process per App.

Product

Base		Base
BTP		BTP
Number of Walk-in Application to be Verified		Duration of Walk-in Verification process per App.

Product

Product

Sum

Base			Base
BTP			BTP
Total Time to Conduct OW Verification (minutes/year)	Productive Minutes per FTE		Total Time to Conduct ODSP Verification (minutes/year)

Divide by   Divide by

Sum

Clerical and IMO Gross Up, OW and ODSP	Product

Base
BTP
Total Number of FTEs for Verification

Net: Effect due to BTP

Level 3A

Effect 4:   Administrative Productivity Gain Due to Automated Letters and Forms
Metric: Number of Administrative FTEs

Base	Base	Base	Base
BTP	BTP	BTP	BTP
Number of Letters per case, OW and ODSP	Time to produce Letters, OW and ODSP (Minutes/ Letter)	Number of Forms per case, OW and ODSP	Time to produce forms, OW and ODSP (Minutes/ Form)

Product   Product

Base	Base
BTP	BTP
Time to Produce Letters, OW and ODSP (Minutes/Case)	Time to Produce Forms, OW and ODSP (Minutes/Form)

Sum

	Base
Total Number of Cases, OW and ODSP (Number/year)	BTP
	Time to Produce Letters and Forms, OW and ODSP (Minutes/Case)

Product

Base	
BTP	
Total Time to Produce Letters and Forms, OW and ODSP (Minutes/year)	Productive Minutes per FTE

Divide by

IMO Gross Up, OW and ODSP	Product

Net: Effect due to BTP

Base
BTP
Total Number of FTEs to produce Letters and Forms

Level 3A

Functional/Process Group: Intake/Case Management
BTP Integrated Sub-Initiative: Centralized File Management and Eligibility
                                     and Entitlement Calculation Software
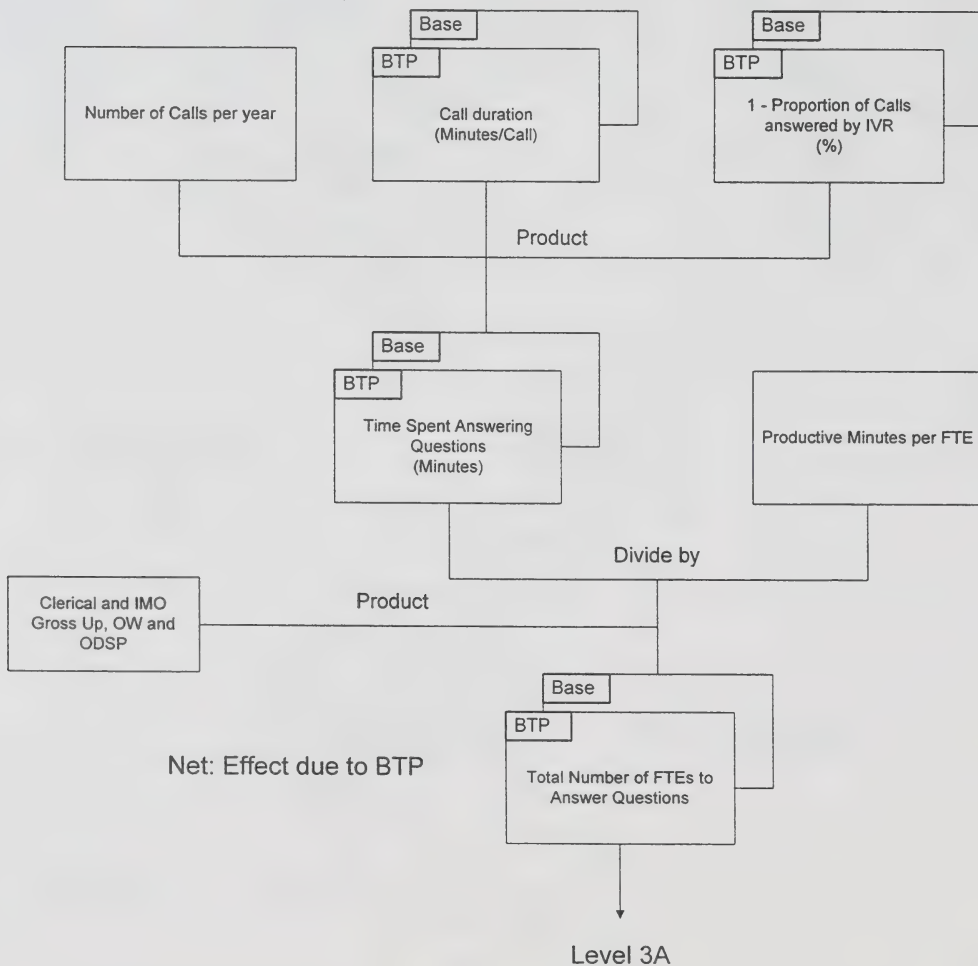
Effect 5:   Administrative Productivity Gain Due to Automated Overpayment Calculations
Metric: Number of Administrative FTEs

Effect 6:   Administrative Productivity Gain due to Reduced Time Answering Questions
Metric: Number of Administrative FTEs

Number of Calls per year	Base / BTP — Call duration (Minutes/Call)	Base / BTP — 1 - Proportion of Calls answered by IVR (%)

Product

Base / BTP — Time Spent Answering Questions (Minutes)	Productive Minutes per FTE

Divide by

Clerical and IMO Gross Up, OW and ODSP	Product

Net: Effect due to BTP

Base / BTP — Total Number of FTEs to Answer Questions

Level 3A

Functional/Process Group: Case Management
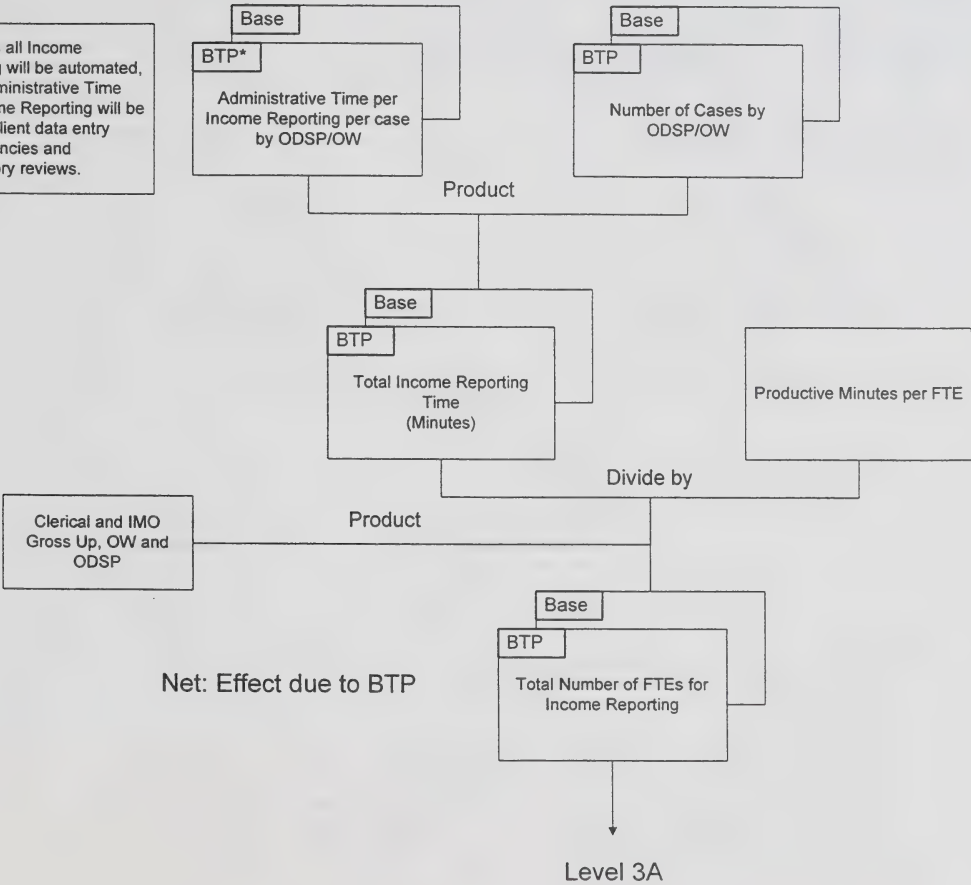BTP Integrated Sub-Initiative: Automated Income Reporting System (via IVR)

Effect 7:   Administrative Productivity Gain due to Income Reporting via IVR
Metric: Number of Administrative FTEs

Note: As all Income
reporting will be automated,
BTP Administrative Time
for Income Reporting will be
due to Client data entry
discrepancies and
mandatory reviews.

Base
BTP*
Administrative Time per
Income Reporting per case
by ODSP/OW

Base
BTP
Number of Cases by
ODSP/OW

Product

Base
BTP
Total Income Reporting
Time
(Minutes)

Productive Minutes per FTE

Divide by

Clerical and IMO
Gross Up, OW and
ODSP

Product

Base
BTP
Total Number of FTEs for
Income Reporting

Net: Effect due to BTP

Level 3A

Reference: 1.2.3 Social Assistance Blueprint - Implementation Plan and Business Case

Effect 8:   Administrative Productivity Gain due to Elimination of ODSP Financial Assessment
Metric: Number of FTEs for Disability Adjudication Unit

Base
BTP
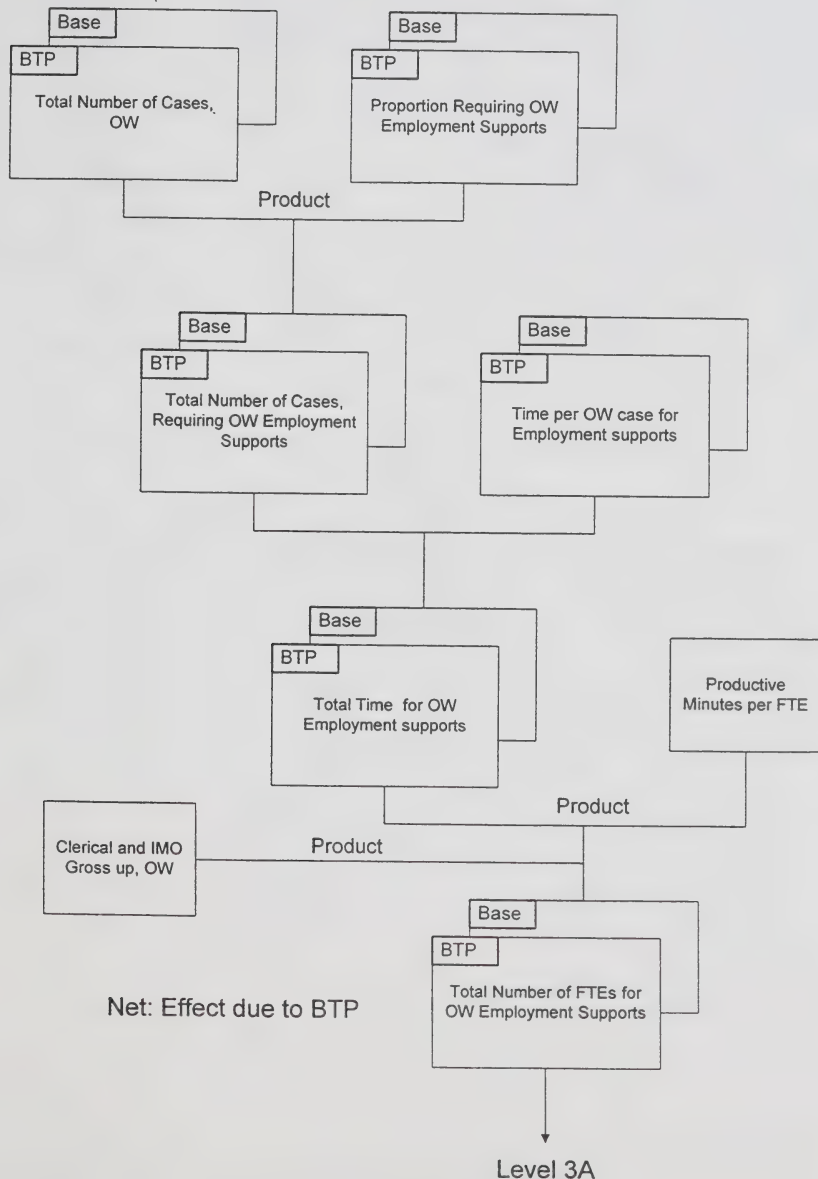Number of ODSP Applications

Base
BTP
Proportion Self-Referred to ODSP

Base
BTP
Proportion Referred from OW

Product

Base
BTP
OW Cases in Non-joint Intake sites requiring new financial assessment

Base
BTP
Time to Complete Financial Assessment of OW Referrals in ODSP

Product

Base
BTP
Total Time to Complete Financial Assessment of OW Referrals in ODSP

Productive Minutes per FTE

Product

Clerical and IMO Gross up, ODSP

Product

Net: Effect due to BTP

Base
BTP
Total Number of FTEs for ODSP Financial Assessment

Level 3A

Functional/Process Group: Case Management
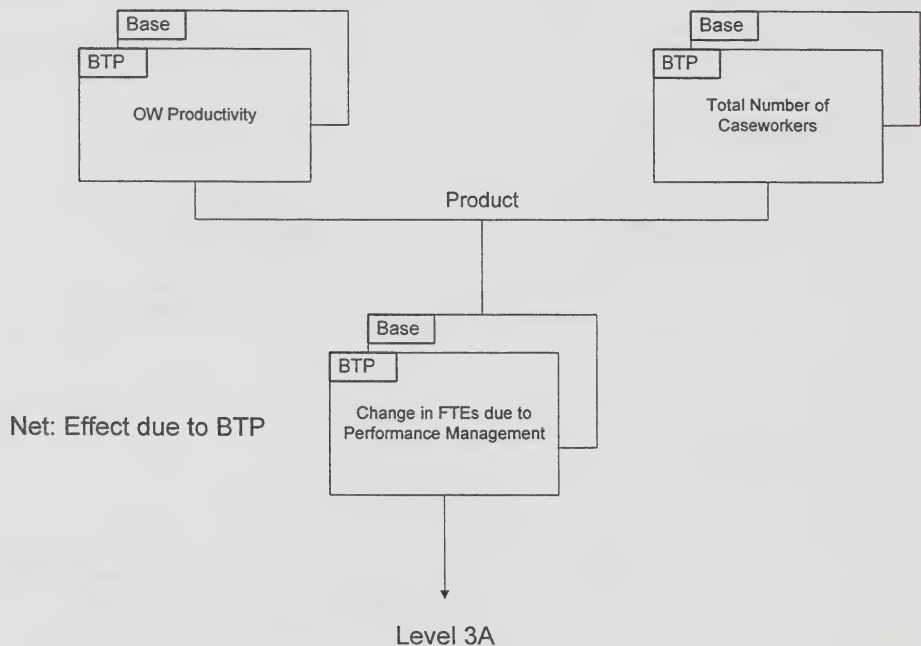BTP Integrated Sub-Initiative: OW Employment Supports System Redesign

Effect 9:   Administrative Productivity Gain due to Organization Redesign
Metric: Number of FTEs for OW Employment Supports

Base
BTP
Total Number of Cases, OW

Base
BTP
Proportion Requiring OW Employment Supports

Product

Base
BTP
Total Number of Cases, Requiring OW Employment Supports

Base
BTP
Time per OW case for Employment supports

Base
BTP
Total Time for OW Employment supports

Productive Minutes per FTE

Product

Clerical and IMO Gross up, OW   Product

Base
BTP
Total Number of FTEs for OW Employment Supports

Net: Effect due to BTP

Level 3A

Effect 10:   Administrative Productivity Gain - Performance Management System
Metric: Number of FTEs

Base		Base	
BTP		BTP	
OW Productivity		Total Number of Caseworkers	

Product

Net: Effect due to BTP

Base	
BTP	
Change in FTEs due to Performance Management	

Level 3A

Functional/Process Group: Intake/Case Management
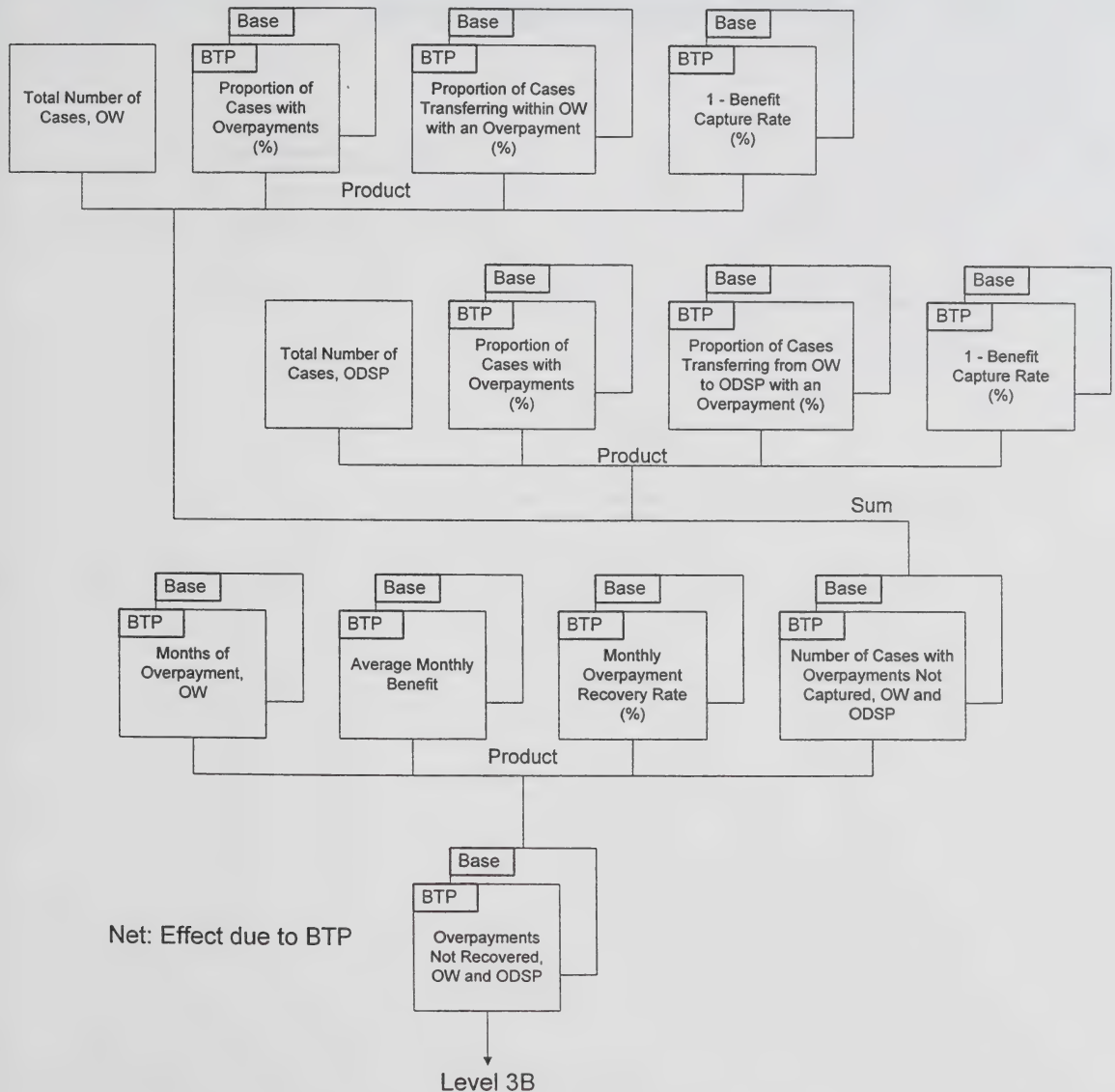BTP Integrated Sub-Initiative: Centralized File Management and Eligibility
                                    and Entitlement Calculation Software
Effect 11:   Program Savings due to Increased Recovery of Benefit Overpayments
               for Clients Transferring Programs
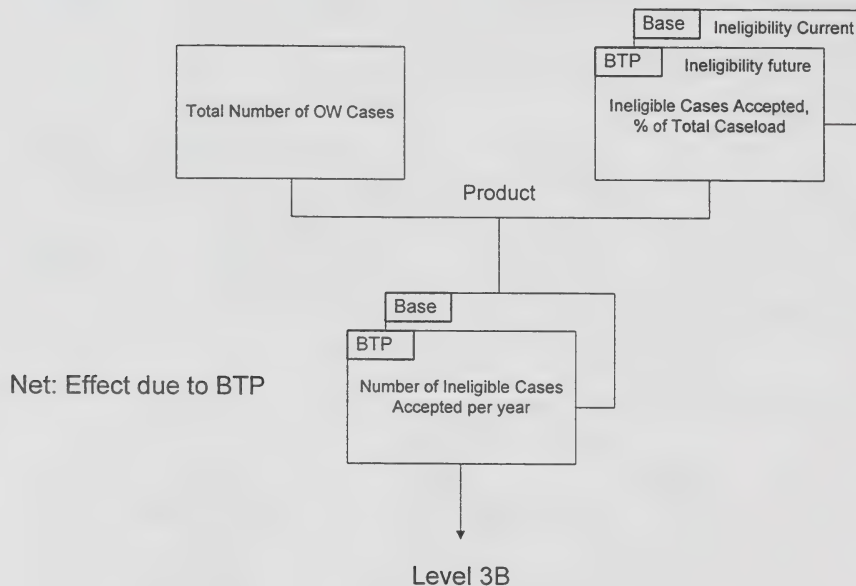Metric: Number of Overpayments Cases Captured per year

	Base		Base		Base
Total Number of Cases, OW	BTP Proportion of Cases with Overpayments (%)		BTP Proportion of Cases Transferring within OW with an Overpayment (%)		BTP 1 - Benefit Capture Rate (%)

Product

		Base		Base		Base
	Total Number of Cases, ODSP	BTP Proportion of Cases with Overpayments (%)		BTP Proportion of Cases Transferring from OW to ODSP with an Overpayment (%)		BTP 1 - Benefit Capture Rate (%)

Product

Sum

Base		Base		Base		Base
BTP Months of Overpayment, OW		BTP Average Monthly Benefit		BTP Monthly Overpayment Recovery Rate (%)		BTP Number of Cases with Overpayments Not Captured, OW and ODSP

Product

	Base
Net: Effect due to BTP	BTP Overpayments Not Recovered, OW and ODSP

Level 3B

Reference: 1.3.1 Social Assistance Blueprint - Implementation Plan and Business Case

Functional/Process Group: Case Management
BTP Integrated Sub-Initiative: Priority Based Assessment System

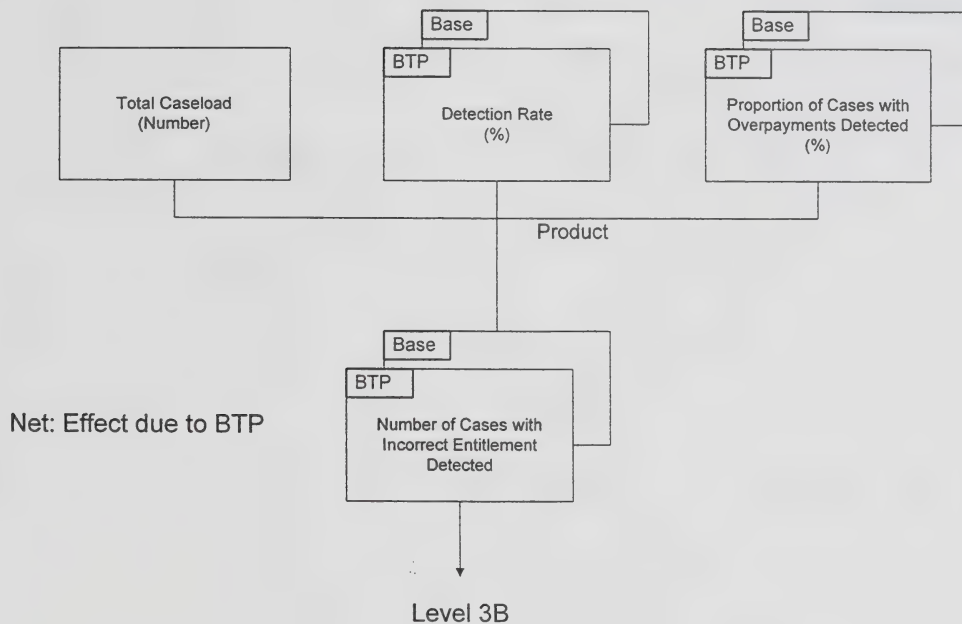Effect 12:   Program Savings due to a Reduction in the Acceptance Rate of Ineligible Cases
Metric: Number of Ineligible Cases Accepted per year

```
┌─────────────────────────┐          ┌──────────────────────────────┐
│                         │          │ Base  │ Ineligibility Current │
│                         │          ├───────┴──────────────────────┤
│ Total Number of OW Cases │         │ BTP    │ Ineligibility future  │
│                         │          ├────────┴─────────────────────┤
│                         │          │ Ineligible Cases Accepted,   │
│                         │          │    % of Total Caseload       │
└─────────────────────────┘          └──────────────────────────────┘
              └──────────────── Product ──────────────┘
                                   │
                      ┌────────────────────────┐
                      │ Base  │                │
                      ├───────┴────────────────┤
                      │ BTP   │                │
                      ├───────┴────────────────┤
 Net: Effect due to BTP │ Number of Ineligible Cases │
                      │    Accepted per year   │
                      └────────────────────────┘
                                   │
                                   ▼
                              Level 3B
```

Effect 13:   Program Savings due to Reduction in Entitlement Overpayment
Metric: Number of Cases with Incorrect Entitlement Detected

Base

BTP

Total Caseload
(Number)

Detection Rate
(%)

Base

BTP

Proportion of Cases with
Overpayments Detected
(%)

Product

Net: Effect due to BTP

Base

BTP

Number of Cases with
Incorrect Entitlement
Detected

Level 3B

Functional/Process Group: Intake
BTP Integrated Sub-Initiative: Disability Adjudication Unit

Effect 14:   Program Savings due to Disability Determination
Metric: Number of ODSP Expenditures per year

Effect 15:   Program Savings - Performance Management System
Metric: Number of Overall Payments

Net: Effect due to BTP

Base

BTP

% Change in Program
Expenditure due to
Performance Management

Level 3B

Functional/Process Group: Intake/Case Management
BTP Integrated Sub-Initiative: Centralized File Management and Eligibility
and Entitlement Calculation Software

Effect 16:   Reduction in Ineligible Clients Receiving Entitlements
Metric: Number of Correct Eligibility Decisions as a Percentage of Total Eligibility
Decisions (%)

Level 3C

Effect 17:   Reduction of Incorrect Records due to Centralized File Management
Metric: Number of Payments Distributed to the Correct Address on Record as a
               Percentage of Total Cheques Distributed (%)

Base	
BTP	
Number of Payments Distributed with Incorrect Addresses	

1.0

Total Payments Distributed (Number)

Minus

Divide by

Net: Effect due to BTP

Base	
BTP	
Number of Payments Distributed to the Correct Address on Record as a Percentage of Total Cheques Distributed (%)	

Level 3C

Effect 18:   Reduction in the Distribution of Incorrect Entitlements
Metric: Number of Payment Cheques Written in the Correct Amount as a Percentage
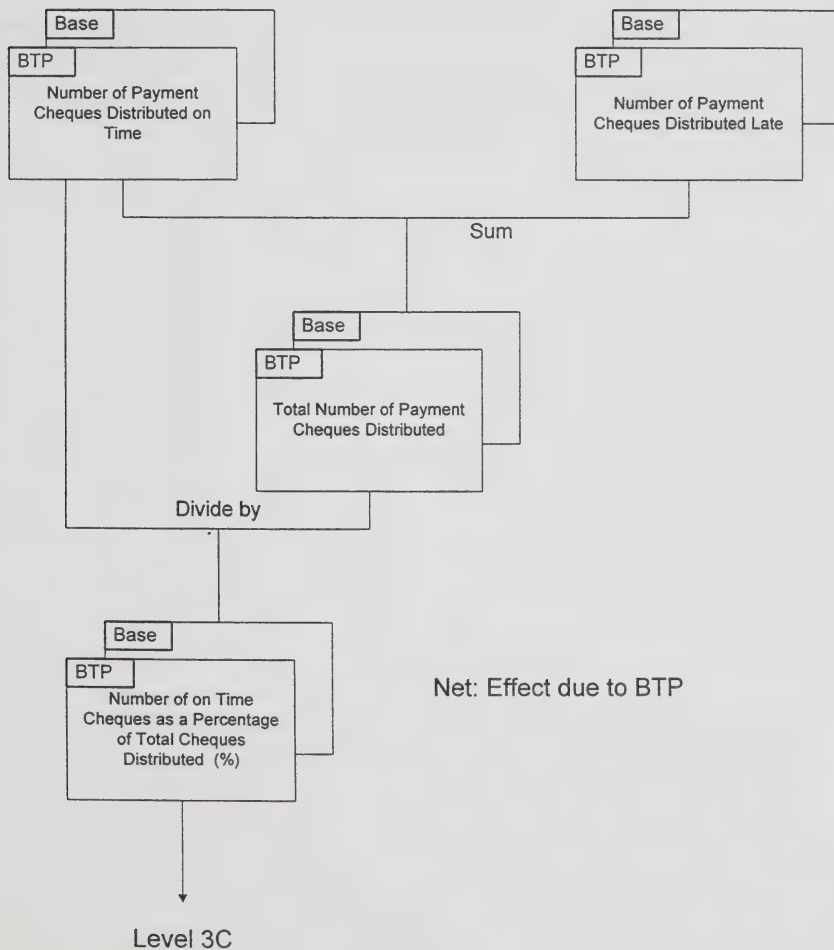of Total Cheques Written (%)

Base

BTP

Number of Underpayments

Base

BTP

Number of Overpayments

Sum

Base

BTP

1.0

Total Number of Incorrect
Payments

Minus

Total Number of Payments

Base

BTP

Net: Effect due to BTP

Number of Payment
Cheques Written in the
Correct Amount as a
Percentage of Total
Cheques Written (%)

Level 3C

Effect 19:   Reduction in Late Cheques
Metric: Number of on Time Cheques as a Percentage of Total Cheques Distributed (%)

| Base |
| BTP |
Number of Payment
Cheques Distributed on
Time

| Base |
| BTP |
Number of Payment
Cheques Distributed Late

Sum

| Base |
| BTP |
Total Number of Payment
Cheques Distributed

Divide by

| Base |
| BTP |
Number of on Time
Cheques as a Percentage
of Total Cheques
Distributed (%)

Net: Effect due to BTP

Level 3C

ANNEX C-II: RISK ANALYSIS WORKSHOP PARTICIPANTS

MINISTRY OF COMMUNITY AND SOCIAL SERVICES

Kevin Costante
Bonnie Ewart
Angela Forest
Allan Gunn
Sue Herbert
Allan Kirk
Rose Langhout
Peter Lowery
Bruce Meyrick
Pauline Moeller
Mary Simpson
Ann Szyptur
Martin Thumm

ANDERSEN CONSULTING

Alden Cuddihey
Tony Grant
John Kaltenmark
Dennis Karbach
Barry Lewis
Bruce Parent
Richard Steinke
Mike Wilson

HICKLING LEWIS BROD

Jean-Pierre Guevremont
Ray Hession
Charles Lanning
Dr. David Lewis

ANNEX C-III: BUSINESS CASE MODEL PROJECTIONS AND RISK ASSESSMENTS

BENEFIT RISK MARKERS

	VarName	Description	Source	Median	Lower	Upper	Units
Common Data							
Productive Minutes per FTE per year	MinFTE	Productive Minutes per FTE		71253	71253	71253	minutes/year
Total Number of Cases per year	BaseCases	Case Load 96/97, OW & ODSP (or predecessors)	S&AU, SA&EO	591000	591000	591000	Cases
	CaseGrow1	Growth in Case Load, 96/97-97/98	S&AU, SA&EO	-5	-5.25	-4.75	%/year
	CaseGrow2	Growth in Case Load, 97/98-98/99	S&AU, SA&EO	-6.3	-6.615	-5.985	%/year
	CaseGrow3	Growth in Case Load, 98/99-99/00	S&AU, SA&EO	-2	-2.1	-1.9	%/year
	CaseGrow4	Growth in Case Load, 99/00-00/01	S&AU, SA&EO	1.6	1.52	1.68	%/year
	CaseGrow5	Growth in Case Load, 00/01-01/02	S&AU, SA&EO	2.6	2.47	2.73	%/year
	CaseGrow6	Growth in Case Load, 01/02-02/03	S&AU, SA&EO	2	1.9	2.1	%/year
	CaseGrow7	Growth in Case Load, 02/03-03/04	S&AU, SA&EO	2	1.9	2.1	%/year
	CaseGrow8	Growth in Case Load, 03/04-04/05	S&AU, SA&EO	2	1.9	2.1	%/year
	CaseGrow9	Growth in Case Load, 04/05 onward	S&AU, SA&EO	2	1.9	2.1	%/year
Proportion of OW Cases:	PropOW	Proportion of OW Cases	BusCase 5/98	66	64	68	Cases
Main, Non-Main, Non-CIMS Caseload:	MNMNCCase	Main, Non-Main, Non-CIMS Caseload, Base Case		20.25	20.25	20.25	% of total caseload
Main, Non-Main, Non-CIMS Caseload With Overpayment::	MNMNCOP	Main, Non-Main, Non-CIMS Caseload with OP, Base Case		11	11	11	% of MNMNC cases
Number of Income Reporting Cases , OW	IRCaseOW	Proportion of Income Reporting Cases, OW, Base Case		75	75	75	% of OW Cases
Number of Income Reporting Cases , ODSP	IRCaseODSP	Proportion of Income Reporting Cases, ODSP, Base Case		4	4	4	% of ODSP Cases

BENEFIT RISK MARKERS

Avg Case Duration, OW:	AvgOWDur	Average OW Case Duration, Base Case		31.6	31.6	31.6 months
Avg Case Duration, ODSP:	AvgODSPDur	Average ODSP Case Duration, Base Case		83.4	83.4	83.4 months
Average Monthly Benefit	AvgSABen	Average SA Benefit, Base Case		1003	1003	1003 $/month
Monthly Overpayment Recovery Rate	Recovery	Monthly Overpayment Recovery Rate		5	5	5 %
Proportion of Active Cases with Overpayments	PropActOPBase	Proportion of Active Cases with Overpayments, Base		30	25	35 %
Proportion of Active Cases with Overpayments	PropActBTP	Proportion of Active Cases with Overpayments, BTP		30	25	35 %
Average Overpayment Screen-out Rate	Average Overpayment		675	675	675	675 $/case
Walk-in Intake Verifications						
Pct IMOs doing Screening and Verification, OW:	Proportion of IMOs, OW		71.84	71.84	71.84	71.84 % of FTEs
Pct IMOs doing Screening and Verification, ODSP:	Proportion of IMOs, ODSP		73.76	73.76	73.76	73.76 % of FTEs
IMO Gross-up, OW:	IMOGrossUpOW	IMO Gross-up Factor, OW (>1.0)		1.91	1.91	1.91 Factor
IMO Gross-up, ODSP:	IMOGrossUpODSP	IMO Gross-up Factor, ODSP (>1.0)		1.79	1.79	1.79 Factor
Clerical Gross Up, OW and ODSP	ClerGrossUp	Clerical Gross-up Factor (Supervision) (>1.0)		1.14	1.14	1.14 Factor
Clerical Salary, OW and ODSP	ClerSal	Clerical Annual Salary		38520	38520	38520 $/year
IMO Salary, OW	IMOSalOW	IMO Annual Salary, OW		48123	48123	48123 $/year
IMO Salary, ODSP	IMOSalODSP	IMO Annual Salary, ODSP		57359	57359	57359 $/year
	PropUP	Proportion of Underpayments to Overpayments		0.2	0.2	0.2 Factor
	CurrOWFTE	Current OW Caseworker FTEs		2775	2775	2775 FTEs
	CurrODSPFTE	Current ODSP Caseworker FTEs		811	811	811 FTEs

BENEFIT RISK MARKERS

Effect 1: Administrative Productivity Gain due to Improved Screening					
Screening Time per Application, Base Case	ScreenTimBase	Screening Time per Application, Base Case	1	1	1 minutes/app
Screening Time per Application, BTP	ScreenTimBTP	Screening Time per Application, BTP	20	15	25 minutes/app
Effect 2: Administrative Productivity Gain due to Reduced Time to Access Case Files					
Number of File Accesses per case, OW	AccessOWBase	Number of File Accesses per Case, OW, Base Case	6	4	8 events/case
Number of File Accesses per case, ODSP:	AccessODSPBase	Number of File Accesses per Case, ODSP, Base Case	1	1	1 events/case
Number of File Accesses per case, OW, Base Case	AccessOWBTP	Number of File Accesses per Case, OW, BTP	2	1.4	2.5 events/case
Number of File Accesses per case, ODSP: BTP	AccessODSPBTP	Number of File Accesses per Case, ODSP, BTP	0.57	0.57	0.57 events/case
Time to Access File, OW:	TimAccOWBase	Time to Access File, OW, Base Case	20	15	30 min/event
Time to Access File, ODSP:	TimAccODSPBase	Time to Access File, ODSP, Base Case	23.5	20	27 min/event
Total Time to Access Files per year, OW:	TimAccOWBTP	Time to Access File, OW, BTP	6.88	5	10 min/event
Total Time to Access Files per year, ODSP:	TimAccODSPBTP	Time to Access File, ODSP, BTP	7.75	6	11 min/event
Effect 3: Administrative Productivity Gain due to Improved Verification					
Total Number of OW Applications per year to be Verified:	DurOWVerBase	Duration of OW Verification Process, Base	88.8	80	97 min/event

BENEFIT RISK MARKERS

	Variable	Description				
Total Number of ODSP Applications per year to be Verified:	DurOWVerBTP	Duration of OW Verification Process, BTP		68.8	60	77 min/event
	DurODSPVerBase	Duration of ODSP Verification Process, Base		121.6	100	180 min/event
	DurODSPVerBTP	Duration of ODSP Verification Process, BTP		101.6	85	150 min/event
Walk-ins (OW):	DurWalkBase	Duration of Walk-in Verification Process, Base		30	20	45 min/event
Walk-in Duration:	DurWalkBTP	Duration of Walk-in Verification Process, BTP		30	20	45 min/event
Interface Checking, Duration per verification:	DurVerIntBase	Duration of Interface Verification, Base		30	30	30 min/event
	DurVerIntBTP	Duration of Interface Verification, BTP		30	30	30 min/event
Effect 4: Administrative Productivity Gain due to Automated Letters and Forms						
Number of Letters per case, OW	LetCaseOWBase	Letters/case, OW, Base		6	5.2	7 letters/case
	LetCaseOWBTP	Letters/case, OW, BTP		1.5	1	2.2 letters/case
Number of Letters per case, ODSP	LetCaseODSPBase	Letters/case, ODSP, Base		6	5	7 letters/case
	LetCaseODSPBTP	Letters/case, ODSP, BTP		4.8	4	6 letters/case
Number of Forms per case, OW	FrmCaseOWBase	Forms/case, OW, Base		9.78	9	10.6 letters/case
	FrmCaseOWBTP	Forms/case, OW, BTP		4.42	3	6 letters/case
Number of Forms per case, ODSP	FrmCaseODSPBase	Forms/case, ODSP, Base		2.18	2	3 letters/case
	FrmCaseODSPBTP	Forms/case, ODSP, BTP		1.09	0.9	1.5 letters/case
	LetTime	Time to Write Letter		4.3	4	5 minutes/letter
	FrmTime	Time to Create Form		1.32	1	1.7 minutes/form

BENEFIT RISK MARKERS

Effect 5: Administrative Productivity Gain due to Automated Overpayment Calculations						
Time to Complete Overpayment Calculations	OPCalcTimBase	Time to Complete Overpayment Calculation, Base	60	40	70	minutes/case
	OPCalcTimBTP	Time to Complete Overpayment Calculation, BTP	0	0	0	minutes/case
Effect 6: Administrative Productivity Gain due to Reduced Time Answering Questions						
Total Number of Calls per year	QuesCase	Questions per Case per Year	30	30	30	Q/Case/year
Call duration	QuesDur	Average Question Duration	4.14	3	7	minutes/question
Propotion of Calls Eliminated	QuesBase	Proportion of Questions Diverted to IVR, Base	0	0	0	%
	QuesBTP	Proportion of Questions Diverted to IVR, BTP	26	10	30	%
Effect 7: Administrative Productivity Gain due to Income Reporting via IVR						
Number of Income Reporting Cases, OW	IRCaseOW	Proportion of Income Reporting Cases, OW, Base Case	75	75	75	% of OW Cases
Number of Income Reporting Cases, ODSP	IRCaseODSP	Proportion of Income Reporting Cases, ODSP, Base Case	4	4	4	% of ODSP Cases
Administrative time per income reporting case, OW:	IRTimBase	Admin Time per Income Reporting Case, Base	56.8	56.8	56.8	minutes/case
Administrative time per income reporting case, ODSP:	IRPropDis	Proportion of IR Cases with Discrepencies	3.4	3.4	3.4	% of Cases
Proportion of Cases with Discrepencies:	IRTimNoDBTP	Admin Time per IR Case, BTP, No Discrepencies	4	3	6	minutes/case

Administrative time per income reporting case, No discrepencies, OW:	IRTimwDBTP	Admin Time per IR Case, BTP, With Discrepencies	27.9	20	40 minutes/case
Effect 8: Administrative Productivity Gain due to Elimination of ODSP Financial Assessment					
Number of Cases Referred from OW	PropODSPAppsOW	Proportion of ODSP Applications Referred from OW	75	75	75 % of ODSP Apps
OW Cases in Non-joint Intake sites requiring new financial assessment	PropNJBase	Cases in Non-Joint Sites Needing New Fin Assessment, Base	50	50	50 % of Apps from OW
	PropNJBTP	Cases in Non-Joint Sites Needing New Fin Assessment, BTP	0	0	0 % of Apps from OW
Time to Complete Financial Assessment of OW Referrals in ODSP	DurFinAssess	Duration of Financial Assessment	180	180	180 minutes/app
% Attributable to BTP	DAUAdminBTP	DD - Proportion of Savings Attributable to BTP	20	20	20 % of Savings
Effect 9: Administrative Productivity Gain due to OW Employment Supports	OWTAdmEff	Increased Admin Effectiveness of OWT Redesign	2	1	3 minutes/case
Effect 10 : Administrative Productivity Gain due to Performance Management System	PMSAdmEff	Increased Administrative Effectiveness of Perf Mgmt System	1	0.25	1.5 % of CW Time
Effect 11: Program Savings due to Increased Recovery of Benefit Overpayments					
Proportion of Cases Transferred within OW with an Overpayment	PropOWOW	Prop of Cases Transferred Within OW with OP	15	12	18 %

BENEFIT RISK MARKERS

Proportion of Cases Transferred from OW to ODSP with an Overpayment	PropOWODSP	Prop of Cases Transferred OW to ODSP with OP	10.2	10.2	10.2	%
Overpayment Benefit Capture Rate	OPCaptureBase	Benefit OP Capture Rate, Base	25	20	30	% of OP Cases
	OPCaptureBTP	Benefit OP Capture Rate, BTP	75	65	80	% of OP Cases
Months of Overpayment, OW:	OPDurOW	Average Months of OP, OW	12	12	12	months
Months of Overpayment, ODSP:	OPDurODSP	Average Months of OP, ODSP	8	8	8	months
Effect 12: Program Savings due to Reduction in the Acceptance Rate of Ineligible Cases						
Proportion of Ineligible Cases Accepted, Base Case	IneligBase	Proportion of Ineligible Cases Accepted, Base Red'n in Proportion of	12	12	12	% of Caseload
Proportion of Ineligible Cases Accepted, BTP	IneligBTP	Ineligible Cases Accepted, BTP v Base	3	1.3	5.5	% of Caseload
Effect 13: Program Savings due to Reduction in Entitlement Overpayment						% of
Overpayment Detection Rate	OPDetectBase	Overpayment Detection Rate, Base	25	20	30	Overpayments
	OPDetectBTP	Overpayment Detection Rate, BTP	75	65	80	% of Overpayments
Effect 14: Program Savings due to Disability Determination	RedODSPApps	Reduction in ODSP Applications, BTP vs Base	20	20	20	%
	GrantDiff	Difference in Grant Rate, ODSP vs OW - DD	235	235	235	$/month
Effect 15: Program Savings due toPerformance Management	PMSProgEff	Increased Program Effectiveness of Perf Mgmt System	0.05	0.05	0.05	% of Program $

BENEFIT RISK MARKERS

Effect 16: Reduction in Incorrect Records due to Centralized File Management						
Proportion of Payments Returned due to Incorrect Address/DBD Info:	ReturnBase	Payments Returned due to Incorrect Address/DBD, Base	2	2	2	% of payments
	ReturnBTP	Payments Returned due to Incorrect Address/DBD, BTP	1	1	1	% of payments
Proportion of Returned Payments for which correct info existed elsewhere in SA system:	CorrBase	Returned Pmts for which Correct Info Existed, Base	50	50	50	% of payments
	CorrBTP	Returned Pmts for which Correct Info Existed, BTP	0	0	0	% of payments
Effect 17: Reduction in the Distribution of Incorrect Entitlements						
Number of Underpayments	PropUP	Proportion of Underpayments to Overpayments	0.2	0.2	0.2	Factor
Effect 18: Reduction in Late Payments						
Number of Payments distributed on time						
Number of Payments distributed late						
Number of on time payments as a percentage of Total payments distributed						

BENEFIT RISK MARKERS

COST RISK MARKERS

VarName	Description	Median	Lower	Upper	Units
Daily Rates					
DailyRate(1)	Daily Rate, Eff Sept 1/98, AC	2088	2088	2088	$/day
DailyRate(2)	Daily Rate, Eff Sept 1/98, AC Sub	1000	1000	1000	$/day
DailyRate(3)	Daily Rate, Eff Sept 1/98, CSS	340	340	340	$/day
DailyRate(4)	Daily Rate, Eff Sept 1/98, Municipalities	340	340	340	$/day
DailyRate(5)	Daily Rate, Eff Sept 1/98, CSS/Muni Subs	800	800	800	$/day
SunkProj	Sunk Cost to Nov 30/98, Project Planning & O/H	21.104	21.104	21.104	$ Million
Hardware1	One-time Hardware, FY98/99	0	0	0	$ Million
Hardware2	One-time Hardware, FY99/00	0	0	0	$ Million
Hardware3	One-time Hardware, FY00/01	2.1735	2.1735	2.1735	$ Million
Hardware4	One-time Hardware, FY01/02	1.5525	1.5525	1.5525	$ Million
Software1	One-time Software, FY98/99	0.3881	0.3881	0.3881	$ Million
Software2	One-time Software, FY99/00	2.2667	2.2667	2.2667	$ Million
Software3	One-time Software, FY00/01	1.835055	1.835055	1.835055	$ Million
Software4	One-time Software, FY01/02	0	0	0	$ Million
HWLease1	Ongoing HW Lease Costs, FY98/99	0	0	0	$ Million
HWLease2	Ongoing HW Lease Costs, FY99/00	1.224	1.224	1.224	$ Million
HWLease3	Ongoing HW Lease Costs, FY00/01	5.94	5.94	5.94	$ Million
HWLease4	Ongoing HW Lease Costs, FY01/02	5.6	5.6	5.6	$ Million
HWLease	Annual Ongoing HW Lease Costs, Post FY01/02	5.5	5.5	5.5	$ Million/ye
SWLic1	Ongoing SW License Costs, FY98/99	0	0	0	$ Million
SWLic2	Ongoing SW License Costs, FY99/00	0.0657	0.0657	0.0657	$ Million
SWLic3	Ongoing SW License Costs, FY00/01	0.948	0.948	0.948	$ Million
SWLic4	Ongoing SW License Costs, FY01/02	0.894	0.894	0.894	$ Million
SWLic	Annual Ongoing SW License Costs, Post FY01/02	0.8	0.8	0.8	$ Million/ye
OM1	Operating and Mtce Charges, FY98/99	0	0	0	$ Million
OM2	Operating and Mtce Charges, FY99/00	2.36	2.36	2.36	$ Million
OM3	Operating and Mtce Charges, FY00/01	6.99	6.99	6.99	$ Million
OM4	Operating and Mtce Charges, FY01/02	6.74	6.74	6.74	$ Million
OM	FY01/02	6.5	6.5	6.5	Million/ye
Dev1	Development Env Costs, FY98/99	0.7303	0.7303	0.7303	$ Million
Dev2	Development Env Costs, FY99/00	1.44	1.44	1.44	$ Million
Dev3	Development Env Costs, FY00/01	0.7974	0.7974	0.7974	$ Million

COST RISK MARKERS

Dev4	Development Env Costs, FY01/02	0.7974	0.7974	0.7974	$ Million
Dev	Annual Devt Env Costs, Post FY01/02	0.7974	0.7974	0.7974	Million/ye
Train1	Municipal Training Days, FY98/99	0	0	0	days
Train2	Municipal Training Days, FY99/00	0	0	0	days
Train3	Municipal Training Days, FY00/01	0	0	0	days
Train4	Municipal Training Days, FY01/02	0	0	0	days
Train	Municipal Training Days, Post-FY01/02	0	0	0	days/year
External Database Interfaces					
SunkEDI	Sunk Cost to Nov 30/98, Ext Data Int	22.515	22.515	22.515	$ Million
DaysEDI(1)	Workdays from Dec 1/98, Andersen	2080	2080	2080	days
DaysEDI(2)	Workdays from Dec 1/98, Andersen Subs	690	690	690	days
DaysEDI(3)	Workdays from Dec 1/98, CSS Staff	1630	1630	1630	days
DaysEDI(4)	Workdays from Dec 1/98, Municipal Staff	1620	1620	1620	days
DaysEDI(5)	Workdays from Dec 1/98, CSS/Muni Subs	1080	1080	1080	days
Centralized File Management and Eligibility and Entitlement Software					
SunkCFEE	Sunk Cost to Nov 30/98, Cent File	0	0	0	$ Million
DaysCFEE(1)	Workdays from Dec 1/98, Andersen	16510	16510	16510	days
DaysCFEE(2)	Workdays from Dec 1/98, Andersen Subs	5485	5485	5485	days
DaysCFEE(3)	Workdays from Dec 1/98, CSS Staff	13375	13375	13375	days
DaysCFEE(4)	Workdays from Dec 1/98, Municipal Staff	13705	13705	13705	days
DaysCFEE(5)	Workdays from Dec 1/98, CSS/Muni Subs	9030	9030	9030	days
Priority Based Assessment System					
SunkPBAS	Sunk Cost to Nov 30/98, Priority-Based Assess	0	0	0	$ Million
DaysPBAS(1)	Workdays from Dec 1/98, Andersen	2450	2450	2450	days
DaysPBAS(2)	Workdays from Dec 1/98, Andersen Subs	815	815	815	days
DaysPBAS(3)	Workdays from Dec 1/98, CSS Staff	1885	1885	1885	days
DaysPBAS(4)	Workdays from Dec 1/98, Municipal Staff	1845	1845	1845	days
DaysPBAS(5)	Workdays from Dec 1/98, CSS/Muni Subs	1250	1250	1250	days
Centralized Intake Screening					
SunkCIS	Sunk Cost to Nov 30/98, Cent Intake	0	0	0	$ Million
DaysCIS(1)	Workdays from Dec 1/98, Andersen	4070	4070	4070	days

COST RISK MARKERS

DaysCIS(2)	Workdays from Dec 1/98, Andersen Subs	1360	1360	1360	1360	days
DaysCIS(3)	Workdays from Dec 1/98, CSS Staff	3180	3180	3180	3180	days
DaysCIS(4)	Workdays from Dec 1/98, Municipal Staff	3130	3130	3130	3130	days
DaysCIS(5)	Workdays from Dec 1/98, CSS/Muni Subs	2070	2070	2070	2070	days
Disability Adjudication Unit						
SunkDAU	Sunk Cost to Nov 30/98, DAU	3.04	3.04	3.04	3.04	$ Million
DaysDAU(1)	Workdays from Dec 1/98, Andersen	2828	2828	2828	2828	days
DaysDAU(2)	Workdays from Dec 1/98, Andersen Subs	355	355	355	355	days
DaysDAU(3)	Workdays from Dec 1/98, CSS Staff	1965	1965	1965	1965	days
DaysDAU(4)	Workdays from Dec 1/98, Municipal Staff	2405	2405	2405	2405	days
DaysDAU(5)	Workdays from Dec 1/98, CSS/Muni Subs	1455	1455	1455	1455	days
Automated Client Access to Information						
SunkACA	Sunk Cost to Nov 30/98, Client Info	0	0	0	0	$ Million
DaysACA(1)	Workdays from Dec 1/98, Andersen	760	760	760	760	days
DaysACA(2)	Workdays from Dec 1/98, Andersen Subs	250	250	250	250	days
DaysACA(3)	Workdays from Dec 1/98, CSS Staff	390	390	390	390	days
DaysACA(4)	Workdays from Dec 1/98, Municipal Staff	220	220	220	220	days
DaysACA(5)	Workdays from Dec 1/98, CSS/Muni Subs	215	215	215	215	days
Automated Income Reporting System						
SunkAIRS	Sunk Cost to Nov 30/98, Auto IR	0	0	0	0	$ Million
DaysAIRS(1)	Workdays from Dec 1/98, Andersen	840	840	840	840	days
DaysAIRS(2)	Workdays from Dec 1/98, Andersen Subs	280	280	280	280	days
DaysAIRS(3)	Workdays from Dec 1/98, CSS Staff	430	430	430	430	days
DaysAIRS(4)	Workdays from Dec 1/98, Municipal Staff	250	250	250	250	days
DaysAIRS(5)	Workdays from Dec 1/98, CSS/Muni Subs	240	240	240	240	days
OW Employment Supports System Redesign						
SunkOWT	Sunk Cost to Nov 30/98, OWT Redesign	0	0	0	0	$ Million
DaysOWT(1)	Workdays from Dec 1/98, Andersen	2870	2870	2870	2870	days
DaysOWT(2)	Workdays from Dec 1/98, Andersen Subs	960	960	960	960	days
DaysOWT(3)	Workdays from Dec 1/98, CSS Staff	2250	2250	2250	2250	days
DaysOWT(4)	Workdays from Dec 1/98, Municipal Staff	2235	2235	2235	2235	days

COST RISK MARKERS

DaysOWT(5)	Workdays from Dec 1/98, CSS/Muni Subs	1495	1495	1495	days
Case Management System					
SunkCMS	Sunk Cost to Nov 30/98, Case Mgmt	7.931	7.931	7.931	$ Million
DaysCMS(1)	Workdays from Dec 1/98, Andersen	9673	9673	9673	days
DaysCMS(2)	Workdays from Dec 1/98, Andersen Subs	2625	2625	2625	days
DaysCMS(3)	Workdays from Dec 1/98, CSS Staff	7360	7360	7360	days
DaysCMS(4)	Workdays from Dec 1/98, Municipal Staff	7805	7805	7805	days
DaysCMS(5)	Workdays from Dec 1/98, CSS/Muni Subs	5055	5055	5055	days
Payment and Financial System					
SunkPFS	Sunk Cost to Nov 30/98, Payment and Fin	0	0	0	$ Million
DaysPFS(1)	Workdays from Dec 1/98, Andersen	7645	7645	7645	days
DaysPFS(2)	Workdays from Dec 1/98, Andersen Subs	2530	2530	2530	days
DaysPFS(3)	Workdays from Dec 1/98, CSS Staff	5555	5555	5555	days
DaysPFS(4)	Workdays from Dec 1/98, Municipal Staff	5150	5150	5150	days
DaysPFS(5)	Workdays from Dec 1/98, CSS/Muni Subs	3590	3590	3590	days
Performance Management System					
SunkPMS	Sunk Cost to Nov 30/98, Perf Mgmt Sys	0	0	0	$ Million
DaysPMS(1)	Workdays from Dec 1/98, Andersen	2615	2615	2615	days
DaysPMS(2)	Workdays from Dec 1/98, Andersen Subs	810	810	810	days
DaysPMS(3)	Workdays from Dec 1/98, CSS Staff	2000	2000	2000	days
DaysPMS(4)	Workdays from Dec 1/98, Municipal Staff	2015	2015	2015	days
DaysPMS(5)	Workdays from Dec 1/98, CSS/Muni Subs	1340	1340	1340	days

TIMING RISK MARKERS

VarName	Description	Median	Lower	Upper	Units
External Database Interfaces					
StDevEDI	Start of EDI Development, Months after 04/96	41	41	41	months
DurDevEDI	EDI Design Duration	6.4	5.7	9.7	months
DurBuildEDI	EDI Build and Test Duration	17.8	14.3	40.3	months
DurRolloutEDI	EDI Rollout Duration	0	0	0	months
DurProdEDI	EDI Productivity Ramp-up Duration	5	3	6	months
Centralized File Management and Eligibility and Entitlement Software					
StDevCFEE	Start of CFEE Development, Months after 04/96	56.6	54	64	months
DurDevCFEE	Cent File & Elig Engine Design Duration	5.2	4.3	7.7	months
DurBuildCFEE	CFEE Build and Test Duration	15.4	11.7	37.3	months
DurRolloutCFEE	CFEE Rollout Duration	0	0	0	months
DurProdCFEE	CFEE Productivity Ramp-up Duration	12	9	15	months
Priority Based Assessment System					
StDevPBAS	Start of PBAS Development, Months after 04/96	41	41	41	months
DurDevPBAS	Priority-Based Assessment System Design Duration	6.4	5.7	9.7	months
DurBuildPBAS	PBAS Build and Test Duration	17.8	14.3	40.3	months
DurRolloutPBAS	PBAS Rollout Duration	0	0	0	months
DurProdPBAS	PBAS Productivity Ramp-up Duration	12	9	15	months
Centralized Intake Screening					
StDevCIS	Start of CIS Development, Months after 04/96	41	39	47	months
DurDevCIS	CIS Design Duration	3	3	3	months
DurBuildCIS	CIS Build and Test Duration	10	9	26	months
DurRolloutCIS	CIS Rollout Duration	0	0	0	months
DurProdCIS	CIS Productivity Ramp-up Duration	8	6	11	months
Disability Adjudication Unit					
StDevDAU	Start of DAU Development, Months after 04/96	15	13	19	months
DurDevDAU	DAU Design Duration	3	3	3	months
DurBuildDAU	DAU Build and Test Duration	7	6	23	months
DurRolloutDAU	DAU Rollout Duration	12	10	15	months
DurProdDAU	DAU Productivity Ramp-up Duration	6	5	8	months

TIMING RISK MARKERS

Automated Client Access to Information					
StDevACA	Start of ACA Development, Months after 04/96	57	54	62	months
DurDevACA	ACA Design Duration	2	2	2	months
DurBuildACA	ACA Build and Test Duration	9	7	26	months
DurRolloutACA	ACA Rollout Duration	0	0	0	months
DurProdACA	ACA Productivity Ramp-up Duration	4	3	6	months
Automated Income Reporting System					
StDevAIRS	Start of AIRS Development, Months after 04/96	57	54	62	months
DurDevAIRS	AIRS Design Duration	2	2	2	months
DurBuildAIRS	AIRS Build and Test Duration	9	7	26	months
DurRolloutAIRS	AIRS Rollout Duration	0	0	0	months
DurProdAIRS	AIRS Productivity Ramp-up Duration	4	3	6	months
OW Employment Supports System Redesign					
StDevOWT	Start of OWT Development, Months after 04/96	41	39	47	months
DurDevOWT	OWT Design Duration	3	3	3	months
DurBuildOWT	OWT Build and Test Duration	10	9	26	months
DurRolloutOWT	OWT Rollout Duration	0	0	0	months
DurProdOWT	OWT Productivity Ramp-up Duration	4	3	6	months
Case Management System					
StDevCMS	Start of CMS Development, Months after 04/96	41	41	41	months
DurDevCMS	CMS Design Duration	6.4	5.7	9.7	months
DurBuildCMS	CMS Build and Test Duration	17.8	14.3	41.3	months
DurRolloutCMS	CMS Rollout Duration	0	0	0	months
DurProdCMS	CMS Productivity Ramp-up Duration	14	11	17	months
Payment and Financial System					
StDevPFS	Start of PFS Development, Months after 04/96	53	53	53	months
DurDevPFS	PFS Design Duration	6.4	5.7	9.7	months
DurBuildPFS	PFS Build and Test Duration	16.8	14.3	39.3	months
DurRolloutPFS	PFS Rollout Duration	0	0	0	months
DurProdPFS	PFS Productivity Ramp-up Duration	12	9	15	months

TIMING RISK MARKERS

Performance Management System					
	Start of Perf Mgmt Sys Development, Months after				
StDevPMS	04/96	41	41	41	months
DurDevPMS	Perf Mgmt Sys Design Duration	6.4	5.7	9.7	months
DurBuildPMS	Perf Mgmt Sys Build and Test Duration	16.8	14.3	39.3	months
DurRolloutPMS	Perf Mgmt Sys Rollout Duration	0	0	0	months
DurProdPMS	Perf Mgmt Sys Productivity Ramp-up Duration	12	9	15	months

BUSINESS CASE DEVELOPMENT GUIDE FOR COMMON PURPOSE PROCUREMENT (CPP)

Prepared by:

HICKLING LEWIS BROD INC.

February 1999

TABLE OF CONTENTS

1. BUSINESS CASE ANALYSIS

1.1 Purpose of the Guide

The first step in any CPP process is the development of a Business Case Analysis. Essentially, a business case is a detailed investment proposal that includes an analysis of all relevant costs, benefits, and risks associated with a particular IT investment, along with that of its reasonable alternatives. This step in the CPP process is fundamental in that it forms a basis for what follows, i.e., RFP development, vendor selection and evaluation, and contract execution. The business case will serve as a useful tool to help guide the subsequent steps in the procurement process.

The purpose of this guide, then, is to provide practical guidance to OPS IT and responsibility centre (RC) managers on how to evaluate the economic merits of alternative IT investment proposals using business case logic. This guide offers a step-by-step blueprint that managers can use to build the Business Cases needed to make informed investment decisions. It is intended to be adapted by managers for all relevant IT investment decisions.

Assembling a Business Case is a collaborative effort involving all the relevant stakeholders who are affected by the outcome of the project or will be involved in its delivery. These representatives should include business specialists with an understanding of the business requirements to be met and IT specialists with an understanding of the costs and risks inherent in the technologies being considered.[1]

1.2 Organization of the Chapter

Each section of this chapter deals with a different aspect of the IT Business Case:

- *Section 1.3, Problem or Opportunity Statement*—This is a statement describing the circumstances leading to the development of the investment project, i.e., the questions to be resolved by the business case analysis and the boundaries of the investigation. It includes a general description of project goals and objectives that follow directly from and relate directly to the problem to be resolved or opportunity to be exploited (which is explicitly stated).

- *Section 1.4, Identification of Business Case Criteria*—These are criteria which define outcomes or results that will be used to guide investment decision, i.e., Net Present Value, Benefit Cost Ratio, Pay-Back Period, etc.

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[1] This guide satisfies and is consistent with the Business Case preparation guidelines specified by the Management Board in Creating and Using a Business Case for CPP Projects, October 1998, MBS.

- *Section 1.5, Identification of Decision Environment*—The decision environment consists of all investment options which define possibilities.

- *Section 1.6, Identification of Structure and Logic of the Decision Environment*—The structure and logic of the decision environment consist of models in structure and logic framework which identify all of the input variables (costs, benefits, etc.) and relationships that determine business case criterion.

- *Section 1.7, Quantification of Model Inputs and Risk Analysis*— Sources of risk and uncertainty are used as a basis for quantification of model inputs. This involves the identification of central estimates and ranges (10% upper limit and 10% lower limit) for all input variables.

- *Section 1.8, Analysis of Results*—The final result is a forecast of each business case criterion and a quantification of the probability that the forecast will be achieved. In addition, estimates of the probability of achieving alternative forecasts, given uncertainty in the underlying assumptions is given for each investment option. These results are interpreted in light of the problem or opportunity statement.

- *Section 1.9, Summary*—This is a summary of different aspects of a Business Case Analysis.

1.3 Problem or Opportunity Statement

The first step in the development of a business case is the formulation of a problem or opportunity statement. A problem or opportunity statement describes the circumstances leading to the development of the investment project, i.e., the questions to be resolved by the business case analysis and the boundaries of the investigation.

The problem or opportunity statement should include:

- *A description of the problem to be resolved or opportunity to be exploited*: Note that the circumstances leading to the consideration of an investment project may vary. Some projects may be initiated by a problem or potential need. For example, particular software being used to perform some function may be scheduled to be orphaned or the current network set-up for operations of a Ministry may fail to meet the required needs of users. There might also be cases where the initiation of an investment project will arise from the identification of an opportunity. For example, automation of a Ministry's data management process or upgrade of infrastructure, i.e., desktops, LANs, backbones and WANs, may yield large productivity or efficiency gains. The statement of the problem or opportunity should be as specific as possible in identifying the problem or opportunity. The more specific the statement, the more helpful it will be in guiding the determination of investment options. In addition, care should be taken to ensure that the problem or opportunity statement is directed at the underlying cause of the problem, not at symptoms or effects.

- *A statement describing how the proposed investment relates to Ministry goals and objectives, strategies, architectures and infrastructures*: The Ministry's goals and objectives, strategies, architectures and infrastructures should be defined in the Ministry's *Business Plan* and *Long Term Capital Plan*. In addition, most Ministries have an overall information management strategy and an *Information Management Plan* which defines overall IT direction for the Ministry. Consult these plans for help in relating the project's goals and objectives (i.e., benefits etc.) with that of the Ministry.

- *A description of the goals and objectives of the investment project*: The client Ministry must clearly define the project's goals and objectives. This includes a brief summary of the types of benefits expected from the project, expected costs, and schedule considerations. Project goals and objectives must be aligned with and support the business directions and priorities of the Ministry.

The problem or opportunity statement is key to the Business Case. It sets the tone and direction for the analysis that follows. It provides important information about project needs and strategies that must be considered during the preparation of the Business Case.

1.4 Identification of Business Case Criteria

Prior to evaluation, it is necessary to select the criteria to be used in measuring and comparing alternative investment options. There are a variety of such criteria available. All focus on incremental benefits and costs with reference to the base case option. The most common Business Case criteria are:

- *Net Present Value (NPV)*—NPV is defined as the present-day value of benefits minus the present-day value of costs associated with a scenario option. A scenario option with an NPV that exceeds zero means that the scenario option is economically efficient. The preferred option, among the alternatives, would be the option with the largest positive NPV. Any option with a negative NPV should be rejected.

- *Benefit-Cost Ratio*—The benefit-cost ratio is defined as the present value of benefits divided by the present value of costs. The benefit-cost ratio indicates dollars of benefit per dollar of cost. Using this criterion, an option is attractive or worthwhile if the ratio is greater than 1.0. The preferred option, among the alternatives, would be the option with the highest ratio. The major drawback of this criterion is that the option with the highest ratio may not have the greatest payoff in aggregate terms (i.e., largest NPV). Another weakness is the possibility of inconsistencies in the treatment of negative effects. Some may be handles as reductions in benefits, while others may be considered as part of the costs. The benefit-cost ratio would, of course, be different, depending on whether the negative effects are included in the numerator (i.e., as a reduction in benefits) or in the denominator (i.e., as part of the costs) of the ratio.

- *Internal Rate of Return (IRR)*—IRR is defined as the discount rate at which NPV=0. Rate of return should exceed the pre-set hurdle rate to qualify for consideration. A problem arises with the IRR criterion when the net benefit stream switched "signs" (i.e., stream changes from positive to negative) during the analytical period. This situation may occur when a scenario option involves large replacement costs during the period. The result is more than one IRR figure.

- *Hurdle Rate*—The hurdle rate is defined as a minimum threshold rate of return required for consideration of an investment project. A project with a rate of return below the hurdle rate should not be considered.

- *Pay-Back Period*—The pay-back period is defined as the number of years until capital is recouped through the flow of benefits. A short pay-back period means less risk. This criterion, however, may not point to the best economic solution, because it ignores net benefits beyond the pay-back period. The shortest pay-back period may not have the highest payoff in the long term.

- *Nth-Year Benefit*— Nth-year benefit is defined as benefits in the Nth-year after construction (design-build), divided by costs to the Nth date including interest paid during construction (design-build), expressed as a percentage. A ratio equal to the hurdle rate means the project is optimally timed. A ratio below the hurdle rate means the project is premature. A ratio above the hurdle rate means the project is overdue. This criterion, as well, may not point to the best economic solution, because it relates only to timing and not to the aggregate net benefits over the life-cycle of the investment.

- *Change in Person Years*—The change in person years measures the reduction in the number of full-time equivalents (FTEs) needed to accomplish Ministry functions. This reduction is that which would result from implementation of the investment project. Using this criterion, the preferred option, among the alternatives, is the one with the largest reduction.

- *Efficiency of Capital Employed*—As an alternative to NPV, the efficiency of capital utilization may be measured by dividing NPV by the total initial capital expenditure to obtain the net benefit per dollar of investment. This measure is more effective in situations where capital is relatively limited and must be applied most efficiently.

Which Business Case criteria a Ministry chooses depends upon the goals, objectives, and priorities of the particular Ministry. The Ministry should look carefully at each criterion and evaluate which is most consistent with its needs and circumstances. The most common criterion, however is NPV. This is attractive in that it best measures the overall value of an investment over its life-cycle. In addition, the other criteria are easily calculated once NPV is given. This is because the inputs to the NPV model are very similar to those necessary to calculate the other

criteria. Therefore, we suggest that in addition to whatever other criteria a Ministry chooses, it include at a minimum—NPV .

1.5 Identification of Decision Environment

Essentially, the decision environment consists of all investment options which define possibilities.

The following questions will assist in the identification of investment options:

- *Can the problem or opportunity be addressed (solved or exploited) to different degrees?* This question deals with matters of scope, i.e., the magnitude or extent to which an option accomplishes the objectives as stated in the Problem or Opportunity Statement. How well an option meets the objectives is something to be considered. It need not be the case that the Ministry fully satisfy the long-term goals and objectives with any one particular investment project. Note that differences in scope normally imply variations in the level of required investment.

- *Are there different ways of addressing (solving or exploiting) the problem or opportunity?* Whereas the previous question dealt with how much action, this question concerns what kind of action can be taken. Typically, there are many different ways to solve a problem or exploit an opportunity. The number of IT solutions for any given objective or goal may be many, each with different costs, benefits, and risks. Business cases often fail when managers fail to look broadly at available options.

The number and type of investment options differ, depending on the details of the investment project. In the end, however, the costs, benefits, and risks of each option will be compared to that of a base case option. A base case provides the common point of reference against which the costs, benefits, and risks of other options are measured.

Although the base case is likely to resemble the status quo to a substantial degree, important distinctions do exist.

- **Status Quo Option**—The status quo assumes that the Ministry or system will remain static, i.e., no change to current processes, efficiencies, technology, training, or productivity. The status quo option unrealistically assumes the organization is frozen in time.

- **Base Case Option**—The base case assumes that there is continuous quality improvement in current operations, and that optimization of current resources will be realized. It specifies the changes to the status quo that are possible/desirable in order to improve performance within the current mandate and resources.

Management Board Guidelines caution against the use of base line (status quo) assumptions that lead to exaggerated claims of benefits and understatements of costs. This occurs when

Management Board Submissions assume that in the absence of the proposed amendment, nothing will be done to sustain or improve performance and that no capital outlays will occur to improve systems and operations. A "do nothing" option is regarded as unrealistic and unacceptable as a basis for comparing the costs, benefits, and savings associated with other options.

Note that many IT options may be implemented using a variety of strategies. Including alternative strategies increases the effective range of options available to the government. For example, an IT application requirement may be met by one or more of the following options:

- Redefining business processes to achieve the desired result without making an IT investment;

- Re-using or adapting an application developed by another business unit or Ministry;

- Re-engineering the existing system (if there is one) to provide the functionality required;

- Acquiring a commercial off-the-shelf (COTS) product; or

- Custom building a new application.

Strategies for building, adapting, or re-engineering an application include doing it in-house or contracting out, and implementing in phases or all at once.

Options for acquiring IT hardware include:

- Buying it;

- Leasing it;

- Renting it; and

- Greening it (leasing with regular upgrades).

Strategies for implementation include various timing profiles, i.e., delaying the investment until better technology is available or until the proposed technology is more widely used.

1.6 Identification Of Structure And Logic of the Decision Environment

The structure and logic of the decision environment consists of a detailed description in structure and logic framework of the expected benefits, costs, and relationships of various IT investment options which determine Business Case criteria.

Associated with each investment option, are costs and benefits that have a strong impact on an investment's overall value. Therefore, close attention should be given to completely identifying all relevant costs and benefits associated with each option over the life of the project.

1.6.1 Identifying Cost Inputs

Sound investment decisions necessarily include a complete evaluation of all costs associated with the investment. Therefore, the business case should reflect the full cost of the investment project, including initial up-front costs, ongoing costs, and other indirect costs over its life-cycle. Costs associated with IT projects may be broken down into the following categories:

- Design Costs

- Building Costs

- Implementation Costs

- Operating Costs

- Maintenance Costs

Costs within each of the above categories typically are of one of three types:

- Capital Costs

- Labour Costs

- Out-Source Contract Costs

Below is a list of direct up-front (non-recurring) and ongoing (recurring) costs typically associated with IT investment projects. If relevant, these costs should be included in the above categories:

- programming costs

- cost of hardware and peripherals

- software (packaged and customized) costs

- cost of initial data collection or conversion of archival data

- facilities upgrade (including site preparation and renovation) costs

- cost of telecommunications equipment

- user specification costs

- cost of initial user training

- workforce adjustment costs (for affected employees)

- transition costs (such as costs of running parallel systems or converting legacy systems)

- salary and benefit costs of IT staff

- out-source contract costs

- software maintenance and upgrade costs

- cost of computer supplies

- user support costs

- cost of ongoing training

- cost of quality assurance and post-implementation reviews

In addition to these costs, IT investment projects may have the following other costs:

- Indirect (Hidden) Costs: Typically, these costs are caused by an initial loss of productivity. (At first, productivity may drop while users learn new IT tools). In some cases, hidden costs may even exceed direct costs. For example, it has been reported that hidden on-going costs of local and wide area networks can be three times that of direct on-going cots (Managing End User Computing, Nolan, Norton, & Co., 1992.)

- Client Costs: Government IT projects may increase costs to clients (i.e., when government costs are shifted to the client). Client costs may be direct or indirect and are similar to those faced by the Ministry.

- Enterprise-Wide Costs: IT investments may affect individuals and groups that are neither users nor IT service providers (i.e., investment projects often change work processes, sometimes altering how work is performed across the Ministry).

1.6.2 Identifying Benefit Inputs

The range of benefits derived from various IT investment projects differs depending on the project under consideration. Typically, however, benefits fall into one of three categories:

- Productivity (Efficiency) Benefits

- Technological Benefits

- Client (Customer) Service Benefits

Productivity (Efficiency) Benefits

Productivity or efficiency benefits are typically in the form of non-IT labour cost savings. Non-IT labour cost savings may result from one or more of the following:

- elimination of duplication or redundancy of data and process

- increased number of transactions and functions performed electronically

- increased speed of performing transactions and functions

- improved workflow and process

- increased capacity

In addition, IT investments may yield other productivity or efficiency benefits that relate to:

- new opportunities from ease of access and use of information

- better-informed decisions

-

Technological Benefits

Technological benefits also must be considered. Technological benefits usually relate to IT reliability and maintainability.

Reliability benefits might include:

- Increase in Mean Time Between Failure (MTBF): MTBF is defined as the arithmetical average of operating time between system equipment malfunctions when the equipment are operated in accordance with the duty cycles defined.

- Increase in Mean Time Between Computer Program Events (MTBCPE): MTBCPE is defined as the arithmetical average of operating time between system major/critical events during a 72-hour period when the system elements are operated in accordance with the duty cycle defined. Major/critical malfunctions events are those malfunction events which reduce system performance below the performance level as defined.

- Increase in Mean Time Between Critical Failure (MTBCF): MTBCF is defined as the arithmetical average of operating time between system critical failures when the system elements operated as defined.

- Decrease in Number of Faults: A fault is defined as an equipment malfunction that causes any parameter of the equipment performance to deviate from its specified limits.

- Decrease in False Alarms: A false alarm is defined as an event in which fully operational equipment tested out as malfunctioning.

- Decrease in Number of Missed Detections: A missed detection is defined as an event in which malfunctioning operational equipment tested out as fully functional.

- Decrease in Number of Critical Computer Program Errors: A critical computer program error is defined as any error for which the computer programs are unable to support normal system operational functions.

Maintainability benefits might include:

- Decrease in Mean Time To Restore (MTTR): MTTR is defined as the arithmetical average of the time it takes to restore computer system operation following computer system interrupts caused by computer equipment or program events.

- Decrease in Mean Logistics Down Time (MLDT): MLDT is defined as the arithmetical average of the logistic delay time associated with system failures that degrade performance below the mission reliability performance levels and measured over an operating cycle. Logistic delay time is measured for all malfunctions that degrade performance below mission reliability performance criteria that cannot be corrected with onboard resources. Causes of logistic delays include: spare or repair parts, documentation, test equipment or skilled technicians not onboard. Logistic delay time for system failure corrected with onboard spares, equipment and personnel is zero.

Client (Customer) Service Benefits

Note that the government Ministry investing in the IT project is not the only one who may benefit. Often, the Ministry's clients or beneficiaries benefit as well. These benefits might include the following:

- less paperwork (for clients)

- less time spent getting information and services

- improved service (increased quality and/or quantity of service)

1.6.3 Discount Rate Variable

Future IT costs and benefits must be converted to present values so that they can be compared on a common basis. Discounting provides the means to do this. The need to do discount stems from the fact that, even when dealing with constant dollars, the value that is placed on costs and

benefits depends on *when* they occur. A dollar to be received a year from now is worth less than the dollar in one's pocket today, because of opportunities foregone during the year. Note that it is preferable to accrue benefits earlier rather than later and to delay expenditures.

The present value (PV) of a future cost or benefit is determined by the formula:

$$PV = s / (1+r)^n$$

where:

s = future value
r = the annual discount rate
n = number of years from the base year.

The difference between a future value and its corresponding present value increases with the number of intervening years and the discount rate. The present value of a stream of future values is the sum of the present values of each element of the stream.

Although any base year may be selected, the base year for discounting is usually the same as the year in which the decision is made.

1.6.4 Calendar or Fiscal Year

Dollars may be expressed on either a fiscal year or a calendar year basis, but not mixed in the same analysis. In many cases, it is convenient to adopt a calendar year basis, because of the greater availability of calendar year statistics and forecasts. For project evaluations involving benefits or costs that accrue on a fiscal year basis, such as government labour cost savings, it may be simpler to work on a fiscal year basis. Whichever basis is chosen, it must be used consistently throughout the analysis.

1.6.5 Evaluation Period

The costs and benefits of each scenario option are to be evaluated over a timeframe equivalent to the economic (useful) life of the investment option. When options involving assets with different economic lives are being compared, it is recommended that the analytical timeframe equal the useful life of the most durable asset.

1.6.6 Timing Profile Variables

Timing variables which reflect the time frame in which benefits and costs are incurred must be included as well. Timing variables typically relate to implementation and out-placement profiles. The implementation profile is usually given in terms of implementation start (months from project start) and duration (months from implementation start). The out-placement profile is usually given in terms of out-placement start (months from implementation start) and duration (months from first out-placement).

1.6.7 Structure and Logic of the Decision Environment

Once the costs and benefits of the decision environment have been identified, it is time to develop "Structure and Logic Models" which reflect this methodology. A Structure and Logic Model is the identification of all of the variables and relationships that determine a business case criterion. It spans the whole of the decision environment. A Structure and Logic Model depicts the methodology non-mathematically, indicating how all variables and assumptions combine to yield a forecast.

In developing the Structure and Logic Models, it is important to understand and identify all factors and relationships that make up each cost and benefit input. These factors and relationships must be included in the Structure and Logic Models themselves.

Below are a few steps that will aid in the development of these Structure and Logic Models.

- *Step 1:* Begin with the decision criterion of interest expressed in terms of benefits and costs in constant dollars. For example, (assuming the Business Case criteria is NPV) see Figure 1.

- *Step 2*: Develop the constituent components of the benefits and costs in terms of input variables and their relationships. See Figures 2 and 3.

- *Step 3:* Work further up the tree until variables have been broken into all relevant input values. Depict in Structure and Logic format, all the factors and relationships that make up each cost and benefit input. In other words, take each benefit and cost input (in Figures 2 and 3) and break them down into small enough pieces such that reliable data is available. For example, see Figures 4 and 5.

Note that each of the inputs in Figure 5 may be further broken down into its component inputs. For example, see Figure 6. Continue to work further up the tree until each variable has been broken into all relevant factors and relationships (input variables) that compose it. This should be done until there exists sufficient reliable data for each input variable in question.

Note that the exact specification of each cost and benefit input will depend upon the problem or opportunity being considered. Figure 5, for example, is merely one possible specification for how capital costs are determined. It should be the case, however, that the overall model as well as the various input models is general enough to be used for each investment option. Begin with the status quo, and then add variables for the base case and alternatives as appropriate. It may be the case, that in some scenario options, certain inputs are not relevant, i.e., zero.

Note also that the cost and benefit categories depicted here merely serve to help identify all the various costs and benefits associated with a particular IT project. It is not necessary that the structure and logic models reflect this particular classification. How total costs and benefits are allocated across cost and benefit input categories does not much matter, as long as all costs and benefits are accounted for. The cost input categories, though, should reflect the way in which the

data are available. Therefore, before allocating total costs and benefits across input categories, first check to see the form in which the cost data is given. Typically, this will be the way in which the Ministry's budget is structured.
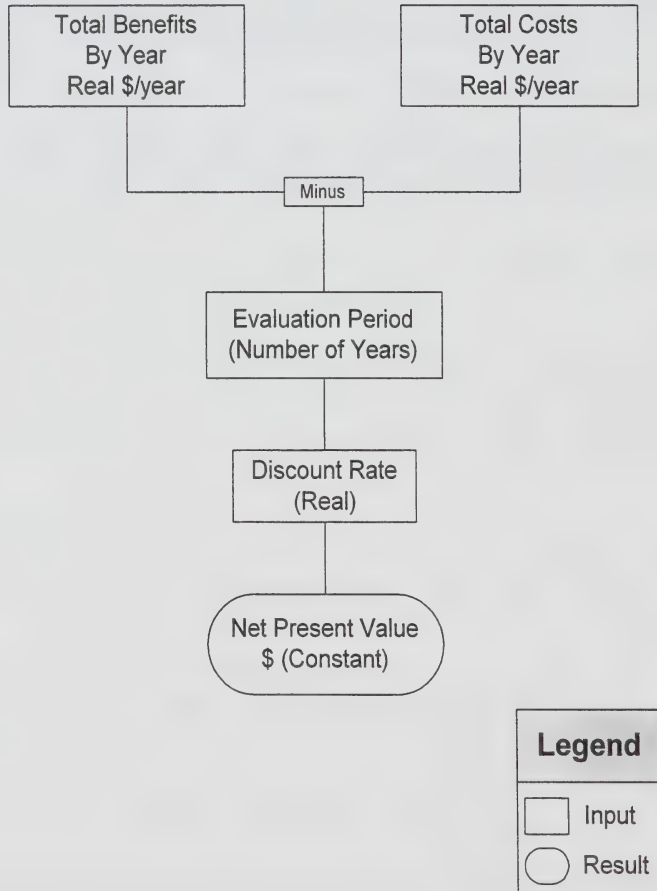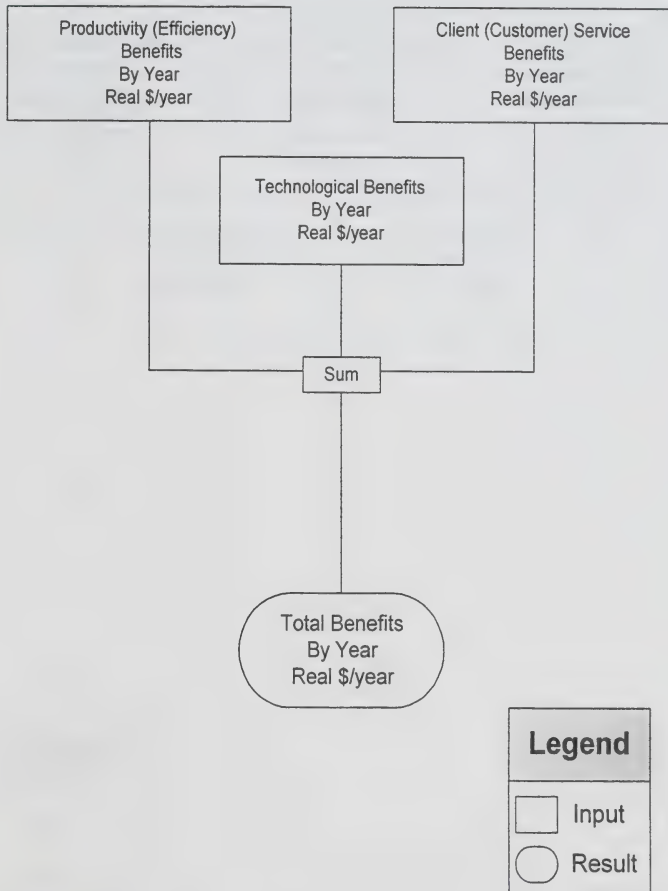
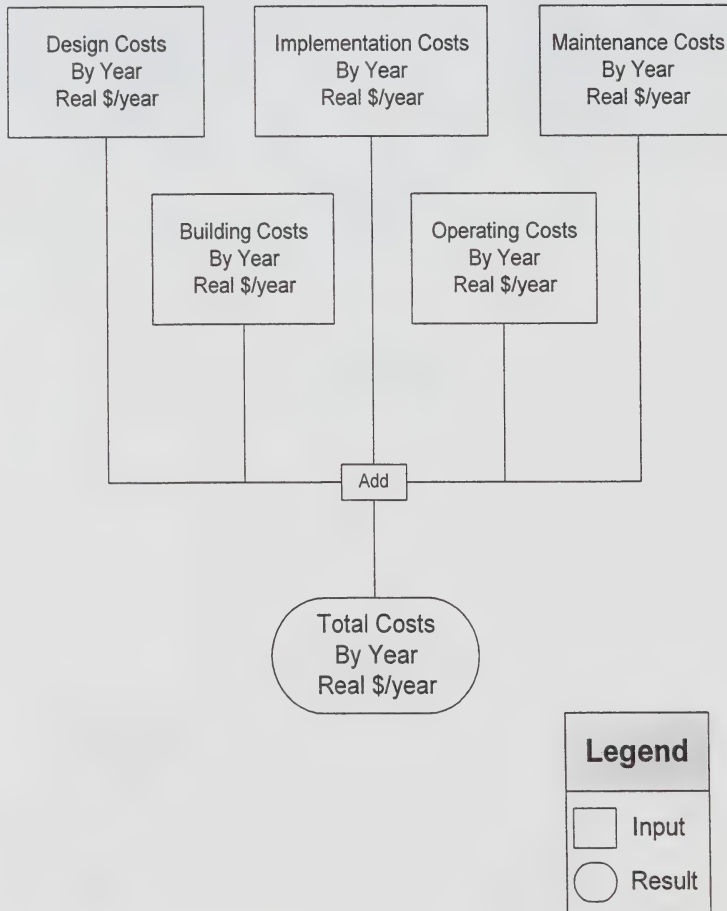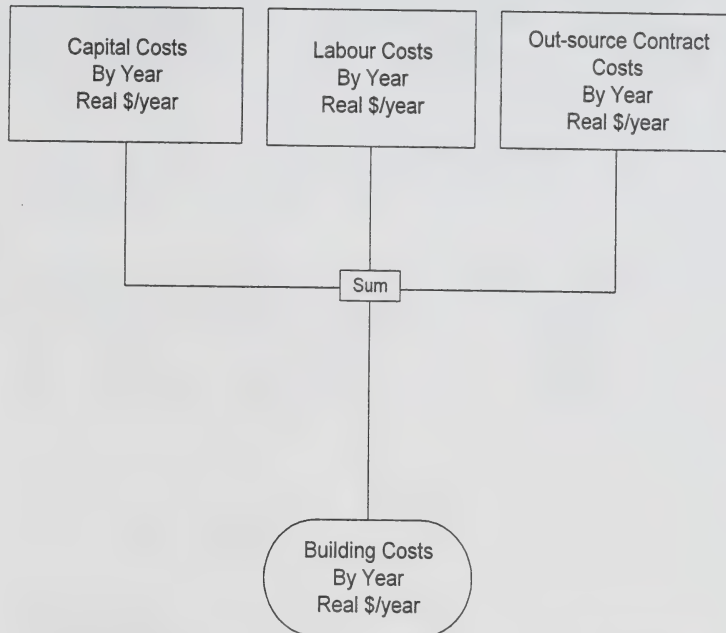Figure 1: Net Present Value

Figure 2: Total Benefits

Productivity (Efficiency) Benefits By Year Real $/year

Client (Customer) Service Benefits By Year Real $/year

Technological Benefits By Year Real $/year

Sum

Total Benefits By Year Real $/year

Legend

☐ Input
◯ Result

Figure 3: Total Costs

Figure 4: Building Costs

Capital Costs
By Year
Real $/year

Labour Costs
By Year
Real $/year

Out-source Contract
Costs
By Year
Real $/year

Sum

Building Costs
By Year
Real $/year

Legend

Input

Result

Figure 5: Capital Costs

Figure 6: Hardware & Network Costs

Hardware & Network
Requirements
(By Type, Quantity)
By Year
Real $/year

Hardware & Network
Current Inventory
(By Type, Number)
By Year
Real $/year

Minus

Hardware & Network
Additional Requirements
(By Type, Quantity)
By Year
Real $/year

Cost per Unit
(By Type)
By Year
Real $/year

Multiply

Hardware & Network
Costs; By Year
Real $/year

Legend

Input

Result

1.7 Quantification of Model Inputs and Risk Analysis

Quantification of model inputs involves the identification of values for all input variables. It is important that every cost and benefit associated with each investment option be quantified. In most cases, this can be done without much trouble. There are however, instances where quantification is more difficult. Typically, these difficulties arise on the benefit side (quantifying costs is usually fairly straight forward). In these cases, there are some well-tested methods that may prove helpful in determining approximate value of hard-to-quantify benefits. They are given below:

- Quantify the value of the benefit's *effects*.

- Set value equal to the cost of *alternative* solutions.

- Set value equal to the cost of *not* providing the benefit.

Note that MBS Business Case preparation guidelines require that both tangible and intangible benefits are quantified. Though each benefit may not reduce to financial cash-flow effects, they do reduce to economic effects.

Because costs and benefits extend into the future (over the life-cycle of the investment), forecasts of model variables necessarily involve risk and uncertainty. This risk and uncertainty must be accounted for in the development of the values given to the model inputs. A proper approach to quantifying model input values in light of uncertainty involves the use of Risk Analysis as a foundation by which the planner can evaluate alternative options under a variety of scenarios.

1.7.1 Risk Analysis

The result of a risk analysis is both a forecast and a quantification of the probability that the forecast will be achieved. Not unlike modern weather forecasting, in which the likelihood of rain is projected with a statement of probability ("there is a 20 percent chance of rain tomorrow"), Risk Analysis is intended to provide the Ministry with a sense of perspective on the likelihood of future events. Risk Analysis is an easily understandable, but technically robust method that allows planners and decision-makers to select the level of risk within which they are willing to plan and make commitments.

The further into the future projections are made, the more uncertainty there is and the greater the risk is of producing forecasts that deviate from actual outcomes. Projections need to be made with a range of input values to allow for this uncertainty and for the probability that alternative economic, demographic, and technological conditions may prevail. The difficulty lies in choosing which combinations of input values to use in computing forecasts, and how to use those forecasts to produce a final estimate.

Forecasts traditionally take one of two forms: first, a single "expected outcome", or second, one in which the expected outcome is supplemented by alternative scenarios, often termed "high" and

"low" cases. Both approaches fail to provide adequate perspective with regard to probable versus improbable outcomes.

The limitation of a forecast with a single expected outcome is clear -- while it may provide the single best guess, it offers no information about the range of probable outcomes. The problem becomes acute when uncertainty surrounding the underlying assumptions of the forecast is especially high.

The high case-low case approach can actually exacerbate this problem because it gives no indication of how likely it is that the high and low cases will actually materialize. Indeed, the high case usually assumes that most underlying assumptions deviate in the same direction from their expected value; and likewise for the low case. In reality, the likelihood that all underlying factors shift in the same direction simultaneously is just as remote as everything turning out as expected.

A common approach to providing added perspective on reality is through "sensitivity analysis", whereby key forecast assumptions are varied one at a time in order to assess their relative impact on the expected outcome. A problem here is that the assumptions are often varied by arbitrary amounts. But a more serious flaw in this approach is that in the real world, assumptions do not veer from actual outcomes one at a time; it is the impact of simultaneous differences between assumptions and actual outcomes that would provide true perspective on a forecast.

Risk Analysis provides a way around the problems outlined above. It helps avoid the lack of perspective in "high" and "low" cases by measuring the probability or "odds" that an outcome will actually materialize. This is accomplished by attaching ranges (*probability distributions*) to the forecasts of each input variable. The approach allows all inputs to be varied simultaneously within their distributions, thus avoiding the problems inherent in conventional sensitivity analysis. The approach also recognizes interrelationships between variables and their associated probability distributions.

To incorporate Risk Analysis into the development of initial values of model inputs:

- First, integrate the Structure and Logic Model developed earlier into risk analysis software.

- Then, for each input variable, enter into risk analysis software, a central estimate and a range (10% upper limit and 10% lower limit) which represents the degree of uncertainty.

Note that in addition to incorporating Risk Analysis into the forecasts of model inputs, other risk monitoring activities must be performed. To satisfy MBS requirements, a capability evaluation of the client Ministry, a risk assessment of the investment project and a risk management plan must also be prepared. These activities are discussed in other chapters of this guide.

1.7.2 Data Collection

Prior to quantification of model inputs, it is important for client Ministriess to gather certain kinds of data. Doing this will facilitate the quantification process. Ministriess should collect the following types of data:

- *Data on the user requirements of the Ministry.* User requirements are typically expressed in terms of user demand. This includes a description of the number and type of users affected by the investment project.

- *Data on the existing technical and infrastructure conditions affecting the investment project.* This includes a description of the current situation, i.e., description of relevant hardware, network, and software conditions in the Ministry.

The quantification of central estimates and ranges for each input variable is performed using special data sheets. A sample data sheet is given in Figure 7 below. Data sheets and variable explanations should be prepared for each input variable and investment option over the time period of interest.

The first column provides space for an initial median estimate, and the second and third columns define a range which represents "an 80 percent confidence interval" -- the range within which we can be 80 percent confident of finding the actual outcome. Thus the greater the uncertainty associated with a forecast variable, the wider the range will be (and vice versa).

Figure 7: Sample Data Sheet

Data Sheet			
Investment Option:			
Variable:			
Year	Median Estmate	10% Lower Limit	10% Upper Limit
Base Year			
Year 1			
Year 2			
Year 3			
Year 4			
Year 5			
.			
.			
.			
.			
.			
.			
Year15			

Note that it is important to distinguish between input and result variables. We advise that intermediate inputs be treated as result variables. If an input is broken down into other inputs, then it is considered an intermediate input and therefore treated as a result variable. For example, the Capital Costs variable is actually an intermediate input, derived from other input variables, i.e., Hardware & Network Costs, Software Costs, PC Costs, etc.. Therefore, the Capital Costs variable is treated as a result variable.

When an input is not able to be broken down any further, it is considered an input variable.

Only input variables are put into the Data Sheets. The input variable estimates (median, 10% low, 10% high) can be gleaned through a variety of means, including research, stakeholder interviews, industry standards, etc..

The probability ranges for each variable will depend upon the degree of risk and uncertainty inherent in each variable. Note that probability ranges for the variables in-question may be established on the basis of both statistical analysis and subjective probability. Ranges need not be normal or symmetrical -- that is, there is no need to assume the bell shaped normal probability curve. The bell curve assumes an equal likelihood of being too low and being too high in forecasting a particular value. It might well be, for example, that if projected inflation rates deviate from expectations, they are more likely to be higher rather than lower. It is important to place no restrictions on the degree of "skew" in the specified ranges and thus maximizes the extent to which the Risk Analysis reflects reality.

Because the probability ranges for each variable will depend upon the degree of risk and uncertainty inherent in each variable, an important first step when developing these input variable estimates is to properly identify and evaluate all relevant risk factors which might affect the investment project. This allows the preparer to assess how risk and uncertainty inherent in the project will affect the attainment of alternative input variable values.

1.7.3 Risk Factors

The nature of risk in IT-related projects will differ depending on the project and investment option considered. However, IT risk typically falls into one of the following five categories:

- Financial Risk

- Economic Risk

- Technological Risk

- Political Risk

- Human Risk

Factors affecting the financial risk of an investment project include:

- capital cost overruns

- scope creep

- slippage

- financial stability of partners and contractors

- federal fiscal framework

- maintenance and operating cost overruns

Factors affecting the economic risk of an investment project include:

- interest rate climate

- market valuation of assets and products

Factors affecting the technological risk of an investment project include:

- shake out

- human factors (with respect to the utilization of technology)

- obsolescence

- reliability

Factors affecting the political risk of an investment project include:

- political resistance to changes in responsibilities and reporting structures

- political resistance to down-sizing

- external political resistance to changes in the organizational mandate

Factors affecting the human risk of an investment project include:

- training budget shortfalls

- labour resistance to down-sizing

- individual resistance to changes in job descriptions or processes

- individual resistance to changes in the organizational or reporting structure

Once, all the relevant risk factors affecting a proposed project are identified, they should be used in the identification of the ranges (10% low, 10% high) placed around each central estimate. In addition, any relevant information resulting from the Capability Evaluation and Risk Assessment should also be used to identify the uncertainty inherent in each input variable.

1.7.4 Monte Carlo Simulation

Once these ranges are identified, Monte Carlo simulation methods should be used to generate "probability density functions" for each input variable. This can be done using some type of risk analysis software. Risk analysis software uses numerical analysis to transform each range into formal "probability density functions" automatically. Note that these "probability density functions" do not have to be determined or presented in either mathematical or graphical form. All that is required is the entry of each variable's central estimate along with its 80 percent confidence interval (10% low value and 10% high value) into the risk analysis software from the Data Sheets. This liberates the non-statistician from the need to appreciate the abstract statistical depiction of probability and thus enables administrators, stakeholders and decision-makers to understand and participate in the process whether or not they possess statistical training.

1.8 Results and Analysis

The "probability density functions" for each input variable should then be combined, again using Monte Carlo Simulation, into individual result variables which are then used to calculate the various business case criteria of interest. This is done automatically by the risk analysis software.

The final result is a forecast of the business case criterion, together with estimates of the probability of achieving alternative outcomes given uncertainty in the underlying assumptions.

This information is presented graphically (See Figure 8) and in table format (See Figure 9). Figure 8 expresses the value of the business case criterion for a particular option along the x-axis and the probability of exceeding particular values along the y-axis. A separate figure is given for each investment option, for each business case criterion of interest. Figure 9 expresses the value of the business case criterion of interest for alternative investment options, under various probability assumptions. A separate table is given for each business case criterion of interest.

Figure 10 underscores the importance of developing a probability-based (risk-based) business case, i.e., incorporating risk analysis into the Business Case Analysis process. Though Options A and B possess similar expected NPVs (with a 50% probability of occurring), Option B entails significantly more risk. A (non-probability-based) traditional business case would only report the value with a 50% probability of occurring.

Once the results are presented, a careful analysis of investment options must be performed. This analysis allows the government to rank alternative investment options according to business case criterion.

Note that it is important to compare options from a probability-based (risk-based) perspective as opposed to simply comparing expected-values (outcomes with a 50% probability of occurring). The effect of risk on the Business Case results is often quite dramatic and provides key information to the decision-maker.

In many instances, the ranking of alternative investment options according to business case criteria, changes, depending on the probability level of interest. For example, consider the results in Figure 10. When considering outcomes with a 50% probability of occurring, Option B would be ranked above Option A. However, when considering outcomes with a 90% probability of occurring, Option A would be ranked above Option B.

MBS recommends a multi-criteria approach to options selection and analysis. As part of the selection and analysis process, the following tasks must be performed:

- For all business case criteria, decide what level of surety (expressed as probability of obtaining outcome values) the government is comfortable with for making selection decisions, i.e., outcomes with a 50% probability of occurring, 80% probability of occurring, or 90% probability of occurring, etc..

- Rank (via a weighting scheme) alternative business case criteria in order of importance to the Ministry.

- Rank each investment option within each business case criterion.

See Assessing the Value of Information Technology, NCR Corporation, for various models used to compare alternative investment options. Note that these models each use as their foundation the results of the business case analysis, i.e., the outcome values associated with each business case criteria.
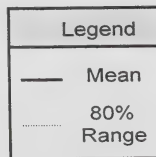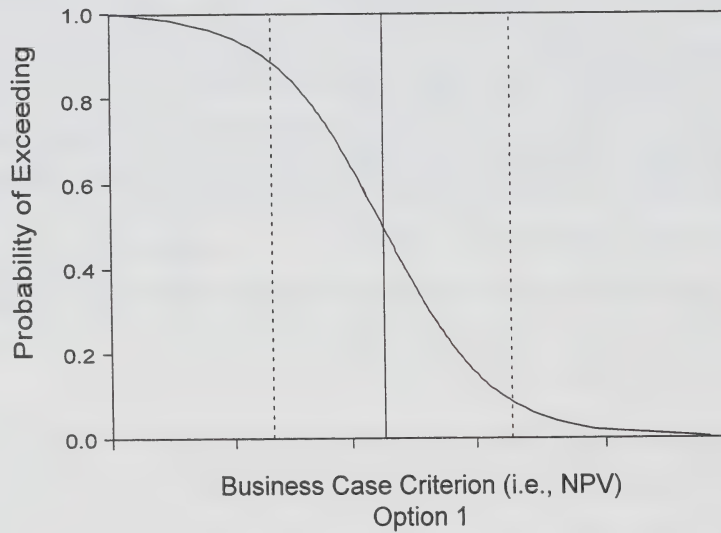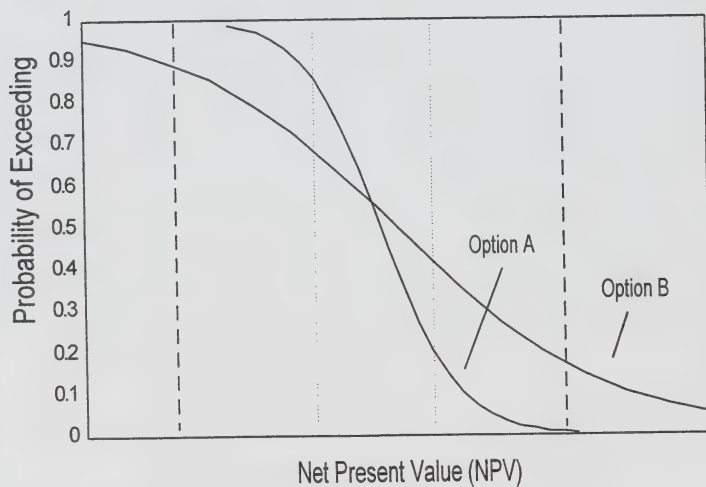
Figure 8: Final Result (Graphical Format)

Figure 9: Final Result (Table Format)

Business Case Criterion (i.e., NPV)*			
	Option 1	Option 2	Option 3
Business Case Criterion (50% Probability of Exceeding)			
Business Case Criterion (50% Probability of Exceeding)			
Business Case Criterion (80% Probability of Exceeding)			
Business Case Criterion (90% Probability of Exceeding)			
Business Case Criterion (95% Probability of Exceeding)			

*Discount Rate:

*Evaluation Period:

Figure 10: Comparison of Options

1.9 Summary

This section is intended to provide practical guidance to Ministries on the methods and process of evaluating the economic merits of alternative investment proposals, using business case logic. This guide offers a step-by-step blueprint for developing business case analyses which allow managers to make informed investment decisions. It is intended to be adapted by managers for all relevant investment decisions.

Essentially, a business case analysis is a detailed investment proposal which includes an analysis of all relevant costs, benefits, and risks associated with a particular investment project, along with that of its reasonable alternatives. This step in the Common Purpose Procurement(CPP) process is fundamental in that it forms a basis for each of the other steps of the process, i.e., RFP development, vendor selection and evaluation, and contract execution.

Below is a summary of each step of the business case development process.

- *Write a Problem or Opportunity Statement*—This is a statement describing the circumstances leading to the development of the investment project, i.e., the questions to be resolved by the business case analysis and the boundaries of the investigation. It includes a general description of project goals and objectives that follow directly from and relate directly to the problem to be resolved or opportunity to be exploited (which is explicitly stated).

- *Identify Business Case Criteria*—These are criteria which define outcomes or results that will be used to guide investment decision, i.e., Net Present Value, Benefit Cost Ratio, Pay-Back Period, etc.

- *Identify Decision Environment*—The decision environment consists of all investment options that define possibilities.

- *Identify Structure and Logic of the Decision Environment*—The structure and logic of the decision environment consist of models in structure and logic framework which identify all of the input variables (costs, benefits, etc.) and relationships that determine business case criterion.

- *Quantify Model Inputs Using Risk Analysis*— Sources of risk and uncertainty are used as a basis for quantification of model inputs. This involves the identification of central estimates and ranges (10% upper limit and 10% lower limit) for all input variables.

- *Present and Analyze Final Results*—The final result is a forecast of each business case criterion and a quantification of the probability that the forecast will be achieved. In addition, estimates of the probability of achieving alternative forecasts, given uncertainty in the underlying assumptions is given for each investment option.